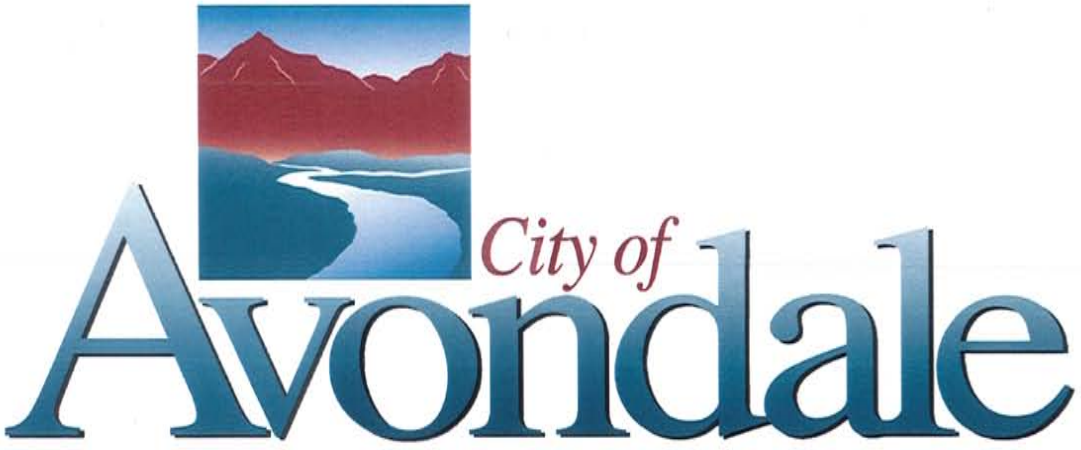
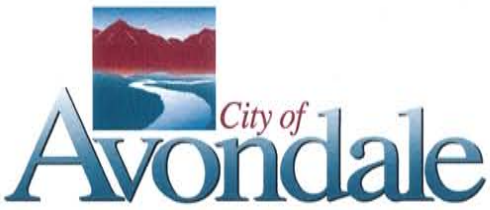


Supplement to MAG Uniform Standard Specifications and Details for Public Works Construction

April, 2008



The City of Avondale Supplement to the Maricopa Associates of Governments (MAG) Uniform Standard Specifications and Details (Specifications and Details) replaces the existing Avondale Construction Specifications Manual dated April 1, 1999. The Avondale Supplement to MAG Uniform Standard Specifications and Details shall be considered a Supplement to the Uniform Standard Specifications and Details for Public Works Construction as published by the Maricopa Association of Governments.

The City of Avondale Supplement to MAG Specifications and Details Manual shall be used in conjunction with all construction improvement plans within the City of Avondale jurisdiction.

Supplement to MAG Specifications and Details

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PART 100 GENERAL CONDITIONS

SECTION
102
BIDDING REQUIREMENTS AND CONDITIONS

Subsection 102.4 EXAMINATION OF PLANS, SPECIAL PROVISIONS AND SITE OF WORK: Is modified to add:

102.4.1 Soil and Subsurface Conditions:

The Contractor shall make his own determinations as to the soil and subsurface conditions, including rock, caliche and ground water, and shall complete the work in whatever material and under whatever conditions may be encountered or created.

SECTION
104
SCOPE OF WORK

Subsection 104.1 WORK TO BE DONE:

104.1.3 Clean-Up and Dust Control: Is modified to add:

104.1.3.1 Air Pollution Requirements

A. The Contractor shall be responsible for dust control related to the project construction and shall take whatever means necessary to control any abnormal conditions.

B. The Contractor shall provide adequate means for cleaning trucks and/or other equipment of mud prior to entering public streets, and take whatever measures are necessary to insure that all roads are maintained in a clean, mud and dust free condition at all times.

C. Temporary drainage control measures may be required during and after construction until final lot build-out in accordance with the approved plans and in accordance with any established or required Best Management Practices (BMP) as part of the National Pollution Discharge Elimination System (NPDES) permit requirements. It is the Contractor's responsibility to meet all requirements.

D. The Contractor is responsible to obtain all Air Quality Permits.

E. The Contractor shall submit to the City a copy of their approved County dust control plan, erosion control plan, and permit prior to the start of work.

F. The Contractor is responsible for maintaining dust control at all times including off hours and week-ends. Work site must be kept debris free. Tracking dirt onto streets is not allowed and if it occurs must be cleaned immediately. Gravel track-out pads or other approved Best Management Practice (BMP) shall be used where applicable.

104.1.3.2 Project Clean-Up

The Contractor shall be responsible for daily and final clean-up operations of adjacent, existing paved streets used by construction traffic. This work includes daily street sweeping, power broom and water as needed or directed by the City.

104.1.3.3 City Water Use

A. If available and feasible, the Contractor shall make arrangements to use irrigation water for construction purposes. Temporary irrigation water holding ponds must be lined with an impervious lining system (PVC sheeting) and also be secured and enclosed for safety purposes with at least a six (6) foot high chain link fence.

B. When City water is used, access must be from an approved fire hydrant. Water must be metered through a City hydrant meter. Requests for meters must be submitted by application through the City's Water Resources Department. Approved applications are then taken by the Contractor to the City's Utility Billing Counter for payment and installation scheduling. The City reserves the right to refuse issuance of hydrant meters for any reason including seasonal/regional demands. City approved backflow prevention devices shall be required on all tank hook-ups or other storage/delivery systems as deemed necessary per COA Standard Detail A1390.

SECTION
105
CONTROL OF WORK

Subsection 105.2 PLANS AND SHOP DRAWINGS: Is modified to add:

105.2.1 Submittals

A. General

All submittals shall conform to the requirements of MAG Standard Specifications Section 105.2, Plans and Shop Drawings, except as modified herein.

B. Shop Drawing Submittals

The following shop drawings or documents shall be submitted for review and approval:

- Traffic control plans
- Haul routes
- Utility protection plans
- Construction schedules
- 24 hour emergency contacts (names and phone numbers)
- Special fabrications/hardware
- Cathodic current testing stations and joint bonding details
- Shoring/trench box protection details (sealed by an Arizona registered professional structural engineer)

C. Format, Distribution and Review

- Shop drawing submittals shall be on no larger than 24 inch x 36 inch, or 11 inch x 17 inch sheets as needed. All drawings shall indicate the name of the job, the City's job number, date, names of the Contractor and subcontractor, and the date of approval by the Contractor. All other technical data, catalog cut sheets, material/fabrication certificates or material mix design reports shall be presented in a three (3) hole, bound, 8½ inch x 11 inch format. Faxed documents are not acceptable. Each submittal package must have a separate transmittal document, cover sheet and index. The Contractor must also create and update a standardized, itemized submittal tracking log spreadsheet and attach with each submittal or re-submittal.
- The Contractor shall first review all submitted data for compliance with the specifications and job requirements prior to any submittal. Clearly indicate what specific item, type, model, class, color, size, etc. is to be used and note any Contractor comments or recommendations on the submitted data. Four (4) identical Contractor approved copies along with a letter of transmittal and the shop drawing index tracking sheet shall be delivered to the City or its authorized representative.
- The Contractor shall anticipate and schedule for a review period of ten (10) business days by the City and/or its designee (20 business days for Fire Department related reviews) during which time the submittal(s) will either be approved, approved with comments, disapproved, asked to be revised, or additional information may be requested. Two (2) reviewed copies, stamped/noted approved or otherwise, will be returned to the Contractor by the City or its authorized representative. Any required re-submittals shall have an additional ten day review period. Re-submittals shall be made within seven (7) business days. The process will be repeated until all required, submitted materials have been approved. Approved shop drawings and other material submittals shall become a

portion of the Contract Documents as they are returned to the Contractor. The above requirements do not apply to the City of Avondale plan review process outlined in the General Engineering Requirement Manual.

D. Materials/Product Data

The following materials/product data shall be submitted for review and approval:

- Pipe, fittings, gaskets, joint restraints, polyethylene encasement material and other hardware appurtenances
- Valves, valve boxes, debris caps, valve key extensions, fire hydrants, tapping sleeves, air/vacuum valve assemblies, corporation/curb stops, service saddles and other appurtenances
- Valve vaults, manholes and other precast structures
- Samples if required

Product data shall include information such as the manufacturer's printed recommendations, compliance with recognized trade association standards, application of testing agency labels and seals, product dimensioning, and notation of coordination requirements.

E. Certificates

The following certificates shall be submitted for review and approval:

- Piping materials
- Reinforcing Steel

Certificates shall be prepared by the manufacturer or testing agency thereof and should include technical specifications and compliance with industry trade association and testing agency standards.

F. Mix Designs

The following mix designs shall be submitted for review and approval:

- Asphalt Concrete (AC) pavement
- Portland Cement Concrete
- Aggregate Base Course (ABC) material
- Controlled Low Strength Material (CLSM)

The mix designs shall directly compare the proposed mix components and properties with those of the referenced standard mix or as modified within the designated specifications.

All dimensions and identification of products and materials included, along with

notation of any coordination requirements and established field dimensions/measurements shall be clearly shown or noted.

G. Warranties

Furnish written warranties and reports on the findings of all tests that are specifically required by the Specifications. Delivery of such warranties and test results shall not relieve the Contractor from any obligation assumed under any other provisions of the Contract.

Subsection 105.3 CONFORMITY WITH PLANS AND SPECIFICATIONS: Is modified to add:

105.3.1 Specifications

All work and materials shall conform with the current Uniform Standard Specifications and Details for Public Works Construction as sponsored and distributed by the Maricopa Association of Governments (MAG).

The Maricopa County Department of Transportation (MCDOT) and Arizona Department of Transportation (ADOT) specifications shall be used where specifically called out on the plans.

The City of Avondale SUPPLEMENT TO MAG SPECIFICATIONS AND STANDARD DETAILS shall be considered part of the construction plans and they shall take precedence over individual plan notes.

105.3.2 Construction Methods

The City shall not be responsible for construction means, methods, techniques, sequences or procedures or for safety precautions or programs utilized in connection with the work. The City and the Engineer shall not be responsible for the Contractor's failure to carry out the work in accordance with the contract documents.

Subsection 105.4 COORDINATION OF PLANS AND SPECIFICATIONS: Is modified to add:

105.4.1 Approved Plans

A City approved set of plans and a City Engineering Right-of-Way Construction Permit shall be maintained on the jobsite at all times work is in progress. Deviation from the plans shall not be allowed without a City approved plan revision or other specific written direction from the City.

Subsection 105.5 COOPERATION OF CONTRACTOR: Is modified to add:

105.5.1 Pre-Construction Meeting

A pre-construction meeting cannot be scheduled until the required City of Avondale permits are obtained. Separate pre-construction meetings may be required for each major phase of work as determined by the City.

105.5.2 Contractor's Representative

The Contractor or his authorized representative shall be present at the work site at all times during working hours. Instructions and information given by the City or its authorized representative to the Contractor's designated representative shall be considered as having been given to the Contractor.

105.5.3 Project Videotape

The Contractor, in the presence of the City's inspector, shall make a video *(DVD format, indexed)* of the project area located in or immediately adjacent to City right-of-way prior to commencing any construction activities. The Contractor and City's Inspector will review the video for completeness, immediately after recording and any areas that are not clearly covered and defined, shall be re-recorded. The Contractor shall submit one (1) copy of the video to the City's Inspector.

105.5.4 Sequence of Construction

The Contractor shall remain sensitive to any ongoing development being constructed in the immediate vicinity of this project area. Good coordination with nearby contractors will be crucial in avoiding construction conflicts and maintaining an efficient working environment. Night and week-end work is typically not allowed. Non-emergency and normal construction work during nights or week-ends requires prior written approval from the City.

Subsection 105.6 COOPERATION WITH UTILITIES: Is modified to add:

105.6.3 Utilities

A. It is the Contractor's sole responsibility to verify the presence and location of any and all existing overhead and/or underground utilities that may interfere with construction. It is the Contractor's sole responsibility to adequately protect and maintain any such utilities, at no additional cost to the City, whether or not said utilities are shown on construction plans. This may include but is not limited to coordinating, potholing and monitoring as directed by the individual utility companies.

B. The Contractor shall be responsible for any and all damage that may be incurred to the utilities and be liable for any repair costs including incidental costs.

C. The Contractor shall not hold the City of Avondale liable due to delays and/or responsible for damages to utilities in conjunction with this construction. The City will not participate in the cost of construction for utility relocation.

D. Contractor shall comply with the Arizona Revised Statutes regarding "Blue Stake" and pothole activities as applicable. The Contractor shall be responsible for contacting the Owner of each utility in conflict and for making all necessary arrangements for relocating, repairing or abandoning the utility or facility as required by the utility Owner.

The Contractor shall be the City's Blue Stake field locator, and perform all requirements as prescribed in A.R.S. 40-360.21 through .29, for all underground facilities that have been installed by the Contractor on the current project, until the project is accepted by the City.

At least two working days prior to commencing excavation, the Contractor shall call BLUE STAKE CENTER, between the hours of 7:00 a.m. and 4:30 p.m., Monday through Friday for information relative to the location of buried utilities. The number to be called is as follows:

Projects In Maricopa County (602) 263-1100

Subsection 105.7 COOPERATION BETWEEN CONTRACTORS: Is modified to add:

105.7.1 Construction by Others

The Contractor shall be responsible for arranging and coordinating construction of all applicable work specified to be done "by others" on the construction plans.

Subsection 105.8 CONSTRUCTION STAKES, LINES AND GRADES: Is modified to add:

105.8.1 Staking

All construction staking shall be at the Contractor's expense.

105.8.2 Staking Requirements for Public Facilities

Unless provided for by the developer/owner, the Contractor shall be required to employ and retain at the work site, a surveyor with the experience and capability of performing all survey, control and layout tasks required of the Contractor to

properly construct the work. The surveyor must be an independent land surveyor registered in the State of Arizona.

A. General

- From established primary control points, Contractor shall furnish all required lines, measurements, grades and elevations for construction of all facilities, structures, pipelines, street construction and all other site improvements.
- Contractor shall establish a base line for the project based upon the control information provided in the Contract Documents and establish a minimum of three bench marks suitable to the work.
- Contractor shall develop and make all detailed surveys, measurements and staking needed for construction including all temporary bench marks, control points, work lines, stationing, grade/slope elevations, pipe/structure inverts, batter boards, off-sets, and cut sheets.
- Contractor shall keep current, accurate, organized and legible as-built notes and measurements of the constructed work. Surveyor shall maintain a complete and accurate log of all control and survey work as it progresses. All survey data, field notes and computations shall be recorded and kept in industry standard hard bound field books, all in accordance with recognized established professional surveying standards.
- Contractor shall be held responsible for the preservation of all bench marks, points, marks, and stakes made or established for the work. Contractor shall re-establish and replace the same, at no additional cost to the City, any construction surveying/staking that has been accidentally, carelessly or willfully destroyed by any party.

B. Survey Staking Guidelines and Tolerances

- Alignment Staking – Every 50 feet on tangent and every 25 feet on curves.
- Slope Staking – Every 50 feet on tangent and every 25 feet on curves; re-stake every ten (10) feet in elevation.
- Easement Staking – Every 50 feet on tangent and every 25 feet on curves; wooden lath with flagging at 100 feet maximum spacing.
- Structures – Line stationing and at least two corners for location with two sets of off-sets plus centerline of inlets/outlets; elevations of bottom or floor and inlet/outlet inverts as necessary.
- Pipelines – Line stationing at appropriate offset dimensions with invert elevations every (see matrix):

PIPELINE STATIONING

WATER	SEWER	STORM DRAIN
25 Feet	25 Feet	50 Feet

Additional pipe line stationing required for all pipe fittings, horizontal/vertical bends, manholes, valves, fire hydrants and all appurtenances.

- Flat Concrete – Cut or fill elevations to top of curb or sidewalk at two feet offsets; every 50 feet on tangent and every 25 feet on curves.
- Roadway – Blue tops every 50 feet on tangent and every 25 feet on curves for subgrade, subbase and edge of pavement.
- Record Staking – Provide permanent stake at stub-outs, services and end-of-lines.
- Horizontal accuracy of easement staking shall be plus or minus 0.1 feet. Accuracy of all other staking shall be plus or minus 0.04 feet horizontally and plus or minus 0.02 feet vertically.
- Survey calculations shall include an error analysis sufficient to demonstrate the required accuracy.

C. Re-establishment of Survey Monuments

- All section corners, quarter corners, and center of sections shall be a brass cap in hand hole per MAG Standard Detail 120-1 Type A. All existing monumentation shall be preserved both horizontally and vertically.
- An Arizona Registered Land Surveyor at the Contractor or Developer's expense must reset any survey monuments disturbed by construction. Disturbed monuments shall be reset to first order accuracy for horizontal location. Any disturbed monuments in the City's Vertical Survey Datum shall be reset to third order accuracy and a new vertical datum established and certified by an Arizona Registered Land Surveyor. At least two other section corner quarter corner monuments on the City's survey list shall be referenced as a check. The survey notes showing these referenced monuments and elevations certifications shall be submitted for approval to the City Engineer before the project will be accepted as completed or bonds released.
- All monumentation information, as referenced above, shall be submitted within 60 days of City acceptance or Certificates of Occupancies will be withheld.
- Monument locations shall be marked with "straddlers" (four nails with metal "shiners") that are driven into the pavement, placed in pairs approximately six feet apart and opposite to each other. Lines connecting opposing pairs shall form a 90 degree cross with three (3) foot legs. The center of the cross shall signify the exact location of the center of the monument to be set. Monuments shall be drilled or punched after they have been installed.

Subsection 105.10 INSPECTIONS OF WORK: Is modified to add:

105.10.1 City of Avondale Notification and Inspections

The Contractor must notify the City's Engineering Department at least two (2) business days before initial start of work. See permit for contact information. A pre-construction meeting with the City shall occur prior to the start of construction. Typical City inspections require a one (1) business day minimum notification. No weekend, holiday or night-time work is allowed unless prior written approval is obtained from the City.

Subsection 105.11 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK: Is modified to add:

105.11.1 Approvals/Acceptance

Any work performed without the approval of the City and/or all work and material not in conformance with the specifications is subject to removal and replacement at the Contractor's expense.

105.15 ACCEPTANCE: Is modified to add:

105.15.1 Acceptance of Improvements

The following general list of requirements shall be completed, approved and accepted by the City prior to the issuance of a Letter of Acceptance. For the Issuance of a Certificate of Occupancy, all requirements for each permitted improvement as listed below shall be completed, approved, and accepted by the City. The date designated on the Letter of Acceptance shall be when the one (1) year warranty period starts. See each separate improvement Construction Specification section for further details.

A. Grading and Drainage acceptance requires complete RLS certified as-built record drawings, building pad elevation certifications, drywell drilling logs/percolation tests, verification of ADEQ drywell registration and drainage basin capacity certifications.

B. Sanitary Sewer acceptance requires complete RLS certified as-built record drawings, trench compaction tests, passing and acceptance of 100 percent air and deflection tests, manhole testing/inspection, line cleaning documentation, removal of temporary plugs, 100 percent TV video inspection, plus documentation, pavement placement (if required), sewer manhole invert worksheets and lateral line stub or service line termination identification per specification.

C. Water acceptance requires complete RLS certified as-built record drawings, trench compaction tests, passing and acceptance of hydrostatic pressure test, passing and acceptance of disinfection tests, backflow test certification, and pavement replacement (if required).

D. Storm Sewer acceptance requires complete RLS certified as-built record drawings, trench compaction tests, line cleaning, and visual manhole/structure inspections. Extended lengths may require TV video inspections.

E. Concrete and Paving acceptance requires complete RLS certified as-built record drawings, all compaction testing, concrete testing reports, asphalt testing reports, and passing water drainage test.

F. Street Light acceptance requires complete RLS certified as-built record drawings, energization of lights, street light pole numbers assigned, installed and documented.

G. Traffic Signal acceptance requires complete RLS certified as-built record drawings, Letter of Acceptance from the City Traffic Division, and three (3) sets of Operation and Maintenance manuals.

H. Landscaping acceptance requires backflow devices certification, as-built record drawings of main lines, Letter of Acceptance from City of Avondale Development Services Department, three (3) sets of Operation and Maintenance manuals, and a certification of two (2) herbicide applications.

I. Pavement Markings and Signage requires as-builts a visual inspection for conformance with the approved improvement plans and Letter of Approval from City Traffic Division.

J. Dry Utilities require trench compaction test results, a Letter of Acceptance from each utility company, and pavement replacement (if required).

K. Utility testing and disinfection documentation

L. Geotechnical/material testing results

M. As-built plan drawings

105.15.2 As-built Record Drawings

- All excavation is to remain open and no backfill shall take place until all underground fittings including but not limited to tees, valves, horizontal bends, vertical bends, stub-outs, and any other required facilities have been as-built. Contractor must make items accessible in which the Contractor's Surveyor can as-built survey and properly document the

elevation and location of all items listed above. Any item which is backfilled without being as-built shall be re-excavated at the Contractor's expense to allow the Surveyor to as-built.

- The Contractor shall maintain a full size set of blue/black line drawings onsite and continuously update these drawings to reflect any and all field adjustments, changes, additions, deletions etc. as they occur during the course of construction. Changes to the original Plan Drawings shall be made by striking through the original information with a single line. The as-built changes shall be noted with the letters 'AB' after the correction. The as-built changes shall be shown in both plan and profile as appropriate. Changes in horizontal alignment shall be noted on the plan and tied down by stationing and offsets from the monument line. Any portions of the Work not constructed shall be clearly labeled "Deleted" or "not built".
- At project completion, the Contractor shall submit a final, clean, full size set of blue/blackline record plan drawings showing the entire project with the as-built information as described above. This final set shall be prepared, reviewed and sealed by the Contractor's surveyor. The City shall review the final paper set for completeness and acceptability. If rejected, the Contractor shall correct or complete the as-built drawings and resubmit for an additional review.
- The Contractor shall submit a RLS certified as-built spread sheet or as-built plan set listing manhole numbers, corresponding MH invert elevations, pipe slopes, lateral, stub and service invert elevations, top of cone shaft/flat top elevation and rim elevations. All elevations shall be taken prior to backfill. The as-built spreadsheet or as-built plan set shall be received reviewed and approved by the City prior to the issuance of a concrete or paving permit. No Certificate of Occupancy shall be given without City approved Sanitary Sewer as-built drawings.
- Once the bond set of redlines as-built plans are approved and accepted the as-built plans shall be submitted in digital file, "TIF" or "PDF" format and on 24 inch x 36 inch mylar (4 mil thickness) and be of quality allowing microfilming.

105.15.3 Final Acceptance

When all work comprised in the plans, specifications and/or Contract has been satisfactorily completed in accordance with the Contract Documents, including clean-up and restoration, the Contractor shall so notify the City or its authorized representative in writing. The City or its authorized representative will then schedule and conduct a final field inspection of the project's work and then prepare a written punch list to itemize and document deficiencies and omissions found related to the work. This will include project administrative close-out tasks including submitting and obtaining approval of final as-built record plan drawings. When all deficiencies and omissions disclosed by the final inspection/punch list have been corrected or completed, acceptance of this project will be given by the

City by a written Letter of Acceptance. The Contractor shall be responsible for the work covered under the Contract until such acceptance is given.

SECTION
106
CONTROL OF MATERIALS

Subsection 106.2 SAMPLES AND TESTS OF MATERIALS: Is modified to add:

106.2.1 Sampling and Testing

For quality control purposes, the Contractor shall provide and pay for all geotechnical services including material sampling and testing. Samples shall be taken under the direction of the City or its authorized representative. Testing shall be performed by an independent testing laboratory, pre-approved by the City or its authorized representative, under the supervision of a professional civil or geotechnical engineer registered in the State of Arizona. Each report shall indicate the location at which the test was made, the date of the test, type and source of material tested, test designation being used and the name of the person who performed the test. The Contractor shall pay for any retesting as a result of a failed test.

A. Geotechnical Tests

A minimum 24 hour notice required to schedule inspections and tests. All tests shall be conducted by a certified geotechnical testing lab, provided for by the Contractor or developer/owner, at their cost. The City does not provide a geotechnical testing service. Sufficient testing shall be done to adequately verity the required densities and tolerances. The location and frequency of tests shall be per MAG and as further directed by the City. All reports and test results shall be submitted to the City for review and approval. Approval of and/or meeting the required minimum test standards are mandatory in continuing on to the next phase of work.

All initial Geotechnical field test results shall be faxed or hand delivered to the City within two (2) business days. Typed final reports shall be delivered to the City within two (2) weeks of the tests being taken.

B. Aggregate Materials for Pipe Bedding/Backfill and Pavement Replacement

The laboratory shall collect the sample from the proposed material source and submit test results for approval. The laboratory report shall identify the source and include gradation of the material, plasticity index, liquid limit and percentage of water. If more than one material source is proposed for approval, the Contractor shall pay for the necessary test to confirm the suitability of the additional sources.

C. Trench Compaction Tests

The Contractor shall excavate the compacted backfill where directed by the City or its authorized representative for the purpose of conducting the following density tests as outlined below. The cost of all excavation, including backfill and re-compaction, shall be the Contractor's responsibility. The materials being compacted shall have the densities outlined in the respective sections of the Specifications. The City or its authorized representative will choose the location and depth for the in-place density tests. If any test made should fail to pass, the area must be reworked and one additional test must be taken at the Contractor's expense. It shall be the responsibility of the Contractor to accomplish the required backfill compaction and to control his operations by providing additional testing as necessary to verify and confirm that the Contractor is complying with the requirements of the compaction specifications. The Contractor shall determine the required optimum moisture content and control this moisture accordingly.

The minimum number of in-place density tests and/or sets required will be as follows:

Trenches crossing existing or proposed streets; one (1) test per crossing.

- Trenches beneath existing or proposed pavement, curb, gutter or sidewalk or when any part of the trench is within five (5) feet of any of the above; one (1) test for the bedding, one (1) test for the backfill and a minimum of at least one (1) test for the base material every 500 feet.
- At all other locations – one (1) test every 500 feet.

D. Poured In Place Concrete

The consistency of the concrete shall be determined and regulated on the basis of the slump test as described by ASTM C-143. Slump tests shall be provided by the Contractor throughout the progress of the project. Concrete shall be of the class and strength indicated on the Contract Plan Drawings or as otherwise directed by these Specifications.

Not less than four (4) cylinder specimens shall be made by the Contractor for each 50 cubic yards of each class of concrete with a minimum of four (4) specimens for each class placed or not less than four (4) specimens for each half-day of placement. Specimens shall be tested in accordance with ASTM C-42. Two (2) cylinders shall be tested at 14 days. If the tested strength meets or exceeds the minimum 14 day requirements, the City may accept the concrete. The City or its authorized representative may have the other two cylinders tested at 28 days, or discard at 60 days. Retesting as a result of failure shall be done at the Contractor's expense.

E. Aggregate Base Materials Compaction Tests

One (1) compaction test will be required on the compacted base material every 500 feet of pavement or fraction thereof. Areas of less than 500 feet in length will require a minimum of two (2) tests. The City or its authorized representative will choose the location and depth of in-place density tests. If any test made should fail, the area must be reworked and two (2) additional tests shall be taken at the Contractor's expense.

The compacted base material shall be compacted to 100 percent of maximum density for the full depth when tested in accordance with MAG Specifications Section 301.3 and 310.2. Aggregate base material shall not be placed on subgrade until final compaction tests of the subgrade have confirmed that the subgrade meets the compaction requirements of these Specifications.

F. Asphalt Concrete Pavement Testing

- One (1) Marshall test, gradation test and oil content test per day, or per 1,000 tons of asphalt placed, which ever is more frequent.
- One (1) nuclear density gauge test every 300 lineal feet per lane per mix.
- Asphalt pavement cores shall be taken in accordance with MAG Standard Specification Section 321.6. If the test cores indicate deficiencies, additional cores shall be required per MAG. Any associated additional testing costs shall be the Contractor's responsibility.

G. Controlled Low Strength Material (CLSM) Testing

The consistency of the CLSM shall comply with the requirements of MAG Specifications Section 728 and be determined and regulated on the basis of the slump test, as described by ASTM C-143. Slump tests shall be provided by the Contractor throughout the progress of the project. If the ½ sack or one (1) sack CLSM cement content, slump or compressive strength exceeds the MAG Specifications per Table 728-1, the City Construction Inspector will not approve the installation of the CLSM material. New test data shall be resubmitted for City approval.

The City Inspector may require the following cylinder tests: four (4) cylinder specimens shall be made by the Contractor for each 50 cubic yards of each class of CLSM with a minimum of four (4) specimens for each class of CLSM placed or not less than four (4) specimens for each half-day of placement. Retesting as a result of failure shall be done at the Contractor's expense.

Subsection 106.5 STORAGE OF MATERIALS: Is modified to add:

106.5.1 Excess Material

Disposal of and/or stockpiling of excess material within the Avondale City limits or municipal planning area will be done in accordance with City regulations. The placing of material on private property requires written authorization from the property Owner. Haul plans and permits are required for offsite import/export.

Subsection 106.6 HANDLING MATERIALS: Is modified to add:

106.6.1 A haul plan for offsite material import or export shall be required for City review and approval prior to the start of hauling. A City right-of-way construction permit shall also be required.

SECTION 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

Subsection 107.2 PERMITS: Is modified to add:

107.2.1 City of Avondale Permits

A. The Contractor shall be responsible to obtain and pay for any and all necessary permits prior to construction, unless provided for otherwise.

B. City of Avondale Engineering permits shall be required for the following work items:

- All work within the City right-of-way, including but not limited to: grading, sanitary sewer, water, storm sewer, non-potable water, concrete, paving, gas, electric, telecommunications, cable TV, fuel lines, irrigation, landscaping, street lights, and traffic signals.
- All onsite grading and drainage improvements including offsite hauling.
- All onsite utilities listed above that will be located in City right-of-way, City easements, or public utility easements. All onsite utility main lines that connect to City utility main lines.

The Contractor shall also provide the City with a copy of the State's Notice of Intent (NOI) for all required site grading work.

Contractor must keep a copy of the approved construction plans, traffic control plan(s), Storm Water Management Plan (SWMP), and City of Avondale Engineering Permit on the jobsite when working. The Contractor is also responsible for obtaining any other required permits from other agencies including MCDOT and a County dust control permit. All Contractors must have a

current insurance certificate on file with the City of Avondale.

All other required permits will be the Contractor's responsibility to obtain including but not limited to; MCDOT right-of-way permit, Maricopa County Environmental Dust Control permit, Flood Control District of Maricopa County Flood Plain Use permit, and City fire hydrant meter.

Subsection 107.5 SAFETY, HEALTH AND SANITATION PROVISIONS: Is modified to add:

107.5.3 Safety

The Contractor agrees to assume sole and complete responsibility for jobsite conditions during the course of construction of this project including safety of all persons and property. This requirement shall apply continuously and not be limited to normal working hours. The Contractor shall defend, indemnify and hold the City harmless from any and all liability, real or alleged, in connection with the performance of work on this project, excepting for liability arising from the sole negligence of the City.

Subsection 107.6 PUBLIC CONVENIENCE AND SAFETY: Is modified to add:

107.6.2.1 Construction Noise Limitations

Per Avondale City Code Chapter 4, Buildings and Building Regulations Article XII Construction Noise Limitations are as follows:

- From May 1st through October 31st, Monday through Friday, construction work shall not begin prior to 5:00 AM and shall stop by 7:00 PM.
- From November 1st through April 30th, Monday through Friday, construction work shall not begin prior to 6:00 AM and shall stop by 7:00 PM.
- Weekends and Holidays: Construction work shall not begin prior to 7:00 AM and shall stop by 7:00 PM on Saturdays and Sundays and on all City, State and Federal holidays.

Subsection 107.7 BARRICADES AND WARNING SIGNS: Is modified to add:

107.7.1 Access

The Contractor shall maintain access to all businesses, schools and residences along the project boundaries at all times. Where there is more than one point of access to a property, the Contractor shall not restrict more than one access at a time. Access to at least one driveway shall be maintained during non-working hours. The Contractor shall also provide for safe and adequate public pedestrian movement through and around the Project as needed. Directional business

name signs shall also be required where access is impacted or limited.

107.7.2 Traffic Control

The Contractor shall be responsible for providing proper barricading and traffic control including access into and throughout the work site. This is to include any upfront potholing activities. A certified traffic control plan must be submitted to the City for review and approval at least three (3) business days before work can take place. The Contractor shall install approved barricading and traffic control, as approved by the City. Traffic control plan must include the project/job name and the assigned City permit number. Plan must comply with the latest MUTCD, City of Phoenix barricade manual and MAG Specification Section 401 as applicable. Barricade setup and related work may not start until the traffic control plan is approved by the City. Permittee shall maintain all traffic control devices on a 24 hour, seven (7) day (24/7) basis. The permit will contain the name and 24/7 contact telephone number. In the interest of public safety, the City may require adjustments/additional devices from what was originally permitted. All additional devices installed shall be at no additional expense to the City.

107.7.3 Construction Access

All construction access locations are subject to City Engineer's approval. The Contractor shall be responsible for maintaining proper and adequate access roads inside and throughout the parcel allowing for inspection accessibility. This includes grading, gravel fill, and trench plates as required.

107.7.4 Trench and Street Barricading

Trench barricading must be safely secured and barricaded at all times. Overnight trenching involving street cuts shall be steel plated in accordance with MAG Standard Detail No. 211 and COA Standard Detail A1103. Steel plate installation shall be type A (milled in) for arterial and collector streets. Type B (ramped) shall be allowed on local streets only. Plates are only allowed for a maximum period of five (5) business days after which the street must be permanently patched. Temporary asphalt patching, if allowed by the Engineering Inspector, is only allowed for a maximum period of five (5) business days after which the street must be permanently patched.

Street barricading and traffic channelization (signs, barricades, fencing and channelizing devices) shall comply with the City of Phoenix Traffic Barricade Manual (TBM). The TBM represents the typical methods required for the uniform application and placement of standard barricade devices. Special circumstances not specifically addressed in the TMB require a separate submittal of a Traffic Control Plan for approval by the City.

SECTION
108
COMMENCEMENT, PROSECUTION AND PROGRESS

Subsection 108.8 GUARANTEE AND WARRANTY PROVISIONS: Is modified to add:

108.8.1 Warranty

All right-of-way related improvements including water, sewer, drainage, streets, and landscaping related items shall be under warranty for a period of one (1) year from City acceptance date. The Contractor shall be responsible for performing any required repair work and all associated costs of repairs within the warranty time frame. All warranty repair work shall be inspected and approved by the City. Thirty (30) calendar days prior to the end of the one (1) year warranty period, a walk through inspection shall take place between the City and the Contractor/Developer. All improvements including drainage structures/facilities, curb and gutter, sidewalk, all pavement and street related work, waterlines and facilities, sewer related facilities, street lights, traffic signals, ROW landscaping, signage and pavement markings shall be re-inspected for damage or failure. Repairs shall be performed as outlined above. For subdivisions, a second television-inspection shall be required for all sewer lines. Storm sewers shall be required to be cleaned by hydro-vac or other approved method.

End of Section

PART 200 EARTHWORK

No City of Avondale Changes

PART 300 STREETS AND RELATED WORK

SECTION
321
ASPHALT CONCRETE PAVEMENT

Subsection 321.1 DESCRIPTION: Is modified to add:

321.1.1 General Requirements

Construction of Paving related improvements shall not begin until the following conditions are met:

A. All underground utility construction including Dry Utilities shall be complete, including backfill and compaction.

B. All water and sewer services, laterals and stub-outs shall be complete, including backfill and compaction.

C. All storm and sanitary sewer invert as-built information shall have been received and approved by the City. See City Sewer Invert Elevation Worksheets and related City specification requirements.

D. All related water and sewer utility testing required by the City shall be complete, approved and accepted. All testing results shall pass City requirements.

E. All geotechnical compaction density testing results relating to the curb/gutter, road subgrade, and sub-base (ABC) work within City right-of-way areas shall have been received and approved by the City. All testing results shall pass City requirements.

F. All required concrete testing shall have been completed and approved with test reports received and accepted by the City. All testing results shall pass City requirements.

G. Any required material technical data submittals (Asphalt Mix Designs) shall have been received and approved by the City.

H. Any required conduit sleeving for utilities, landscaping, etc. shall have been installed. All sleeving conduits under the street improvements shall be schedule 80 PVC

I. The required concrete work only as-builts shall have been submitted, reviewed and approved by the City per the specifications.

J. All utility access covers/lids (valve box, manhole frame/cover) are adjusted.

K. Letters from all the utility companies shall be provided to the City, stating that all underground installations related to the street right-of-way and easements for the project are complete, and that no additional cross street boring will be required.

L. All required geotechnical testing shall be done in accordance with MAG Specifications and as amended by the City's Supplement to MAG Specifications and Details.

M. City approved technical info submittals are required for all materials used on the project. All materials must match approved submittals exactly or they will be rejected, any rejected materials shall be removed from the site immediately.

N. All water valve boxes, sewer manhole frame and covers, sewer clean-outs, and other utility access street penetrations shall have all been accounted for, referenced, and adequately lowered below grade to allow for paving operations. Utility items shall be accurately measured and marked to an off-set point (tied-off) on the adjacent concrete curb or other temporary benchmark as needed. Accurate dimensions shall be indicated. All data shall also be accurately documented on a set of construction plans. Accurate route surveying is also allowed in accordance with industry standards, however current GPS methods are not preferred and can only be used as a backup reference.

O. Final inspection of all concrete and paving improvements is required after the paving phase is 100 percent completed with authorization from the City Engineering Inspector. All utility adjustments, striping and signage shall also be 100 percent complete. Inspections shall include onsite visual inspection, plan checks, and a water flow test; all monitored by the City Engineering Inspector. Water flow tests shall encompass the entire street with adequate water to completely fill all gutters and establish flow. Area shall be wet down 30 minutes prior to the scheduled inspection by water truck. Pre-wet may need to be adjusted depending on season, plus additional water may need to be applied as needed and as directed by the City. All streets including the gutters and sidewalks shall be clean, dirt and debris free. This includes construction debris and stockpiled construction materials.

Subsection 321.2 MATERIALS AND MANUFACTURER: Is modified to add:

Asphalt Concrete design mix material submittals are required and shall be submitted to the City's Engineering Department for review and approval a minimum of five (5) business days prior to the scheduled paving date. It is strongly recommended that a second "back-up" mix design be submitted for review and approval from a different plant location or different material supplier in case the primary supplier is not able to provide delivery. Mix designs and certification documents shall be dated no older than one year. Material

commodity codes printed on the delivery tickets shall match the City approved mix design submittals exactly. Failure to provide the correct mix matching the approved commodity code will result in the paving operation being shut down until the correct material is delivered. Design mixes are required regardless of what material is specified on the City approved construction plans.

Throughout a paving operation that exceeds 400 square yards, the Contractor shall provide a representative from an independent geotechnical testing firm who shall be on site to confirm a rolling pattern, monitor temperatures and check that the required compaction densities are being obtained, for quality control purposes. The lab representative shall also perform the required material sampling and testing per MAG Specification and as modified by the City supplement to MAG. The City Engineering Inspector shall be notified at once if any problems are encountered.

Subsection 321.4 APPLICATION OF TACK COAT: Is modified to add:

321.4.1 Tack Coat:

A tack coat of City approved emulsified asphalt shall be applied per the MAG Specification specified coverage rate between the base course and the surface course paving layers if applicable. If both courses are not completed the same day or if dust or another substance could cause a bond breaking effect, a tack coat shall be applied. City approval is required to pave both base and surface courses in the same day. All base course paving shall be thoroughly cleaned by whatever means necessary to ensure it is free of dirt, mud or other foreign substances before tack application and or surface course paving takes place.

Subsection 321.5 PLACING, SPREADING AND FINISHING: Is modified to add:

A. Unless otherwise authorized by the City, installation of the base and surface courses shall not occur on the same day. Small jobs may be eligible and encouraged to pave both courses in one day but this is to be determined by the City in advance. The base course shall be tested in accordance with MAG Specification and as modified by City specification to verify specification and installation compliance. After the test results have been reviewed and approved by the City, authorization shall be issued and given to the Contractor to schedule installation of the surface course. The surface course shall then be tested to verify specification and installation compliance. Mineral aggregate gradation, asphalt cement content (oil), course thickness and compaction density test reports shall be submitted to the City for review and approval on both base and surface courses.

B. The asphalt edge at lip of gutter shall be min. ¼ inch to max ⅜ inch above lip of gutter with no stray asphalt mix squeezed over onto the gutter, if this occurs all excess asphalt shall be removed using a method that will not damage the gutter.

Subsection 321.5.5 PRESERVATIVE SEAL: Is modified to add:

Unless otherwise directed, application of a preservative seal coat in accordance with MAG specifications shall not be required on new paving.

Subsection 321.6 CORRECTIVE REQUIREMENTS FOR DEFICIENCIES: Is modified to add:

321.6.2 Density Test Reports

Mineral aggregate gradation, asphalt cement content (oil), course thickness and compaction density test reports shall be submitted to the City for review and approval on both base and surface courses. Any paving that does not meet the MAG material and installation specifications, as amended by the City, shall be removed and replaced at the Contractor's expense. Fog seals, chip seals, slurry seals or other remedies shall not be accepted by the City. Extended warranties are also not accepted.

SECTION 333 FOG SEAL COATS

Subsection 333.1 DESCRIPTION: Is modified to add:

Unless otherwise directed, application of a fog seal coat in accordance with MAG specification shall not be required on new paving.

SECTION 336 PAVEMENT MATCHING AND SURFACING REPLACEMENT

Subsection 336.1 DESCRIPTION: Is modified to delete the second paragraph entirely and replace it with the following:

Asphalt concrete pavement replacement shall be constructed in accordance with City of Avondale Standards. City of Avondale standard is to replace pavement, whether parallel or transverse to the direction of traffic flow, with a "T-top" type pavement section. Backfill requirements can be found in the most recent edition of MAG and the City of Avondale Supplement to MAG in Sections 601.4.

Subsection 336.2 MATERIALS AND CONSTRUCTION METHODS: Is modified to add:

Section 336.2.4.3 Street Cuts/Patches

The pavement replacement section for all longitudinal and transverse trenches located in an existing paved street shall be constructed in accordance with MAG

Uniform Standard Detail No. 200, Backfill, Pavement and Surface Replacement, shall be "T"-Top, modified as follows:

A. For trenches the width of the replaced pavement section shall extend one (1) foot beyond the trench side edge line, on either side of the trench. The minimum trench pavement replacement width shall be four (4) feet.

B. The depth of the permanent surface replacement shall be one (1) inch thicker than the removed existing pavement section.

C. Sawcut or construction joints shall be adequately tack oiled.

D. Asphalt material shall be a City approved C-¾ (19 mm) or D-½ (12.5 mm) mix design, MAG Marshall mix design, such as City of Phoenix (COP) mixes or other City approved mix design.

E. Vibratory steel drum roller or vibratory steel drum roller in conjunction with a pneumatic tire roller is the only compaction method allowed.

F. Slurry backfills or open trenches in existing roadways must be properly steel plated and barricaded over night. Temporary asphalt patches or completed and backfilled trench work that remains plated must be replaced as soon as possible and cannot remain for more than five (5) days time or as required by the City.

G. Wherever possible, controlled directional boring shall be used when installing underground utilities including service connections, in or across an existing paved street. Open cut trenching in or across an existing paved street shall not be allowed unless prior written City approval has been obtained. Approved construction plans must specifically designate a street cut. Large diameter bores require specific plans. Unless otherwise approved, minimum pipe/conduit coverage depth shall be 36 inches from the top of street pavement. Any sleeving for conduit or cable installed under new or existing streets shall be Schedule 80 PVC pipe.

H. Major pavement replacements that exceed 600 feet in length shall require pavement re-surfacing in accordance with MAG Specification Section 336.2.4 as modified herein. Surface treatment shall be as required by the City of Avondale using a MAG slurry seal, per MAG Specification Section 332, or an approved micro-seal per City of Phoenix Specification.

I. Anywhere new asphalt paving is installed to match existing A.C. pavement, a minimum two (2) feet wide strip of MAG slurry seal shall be applied centered over the joint. Hot crack sealing may also be allowed on smaller areas. Joint seal type to be as directed by the City Engineering Inspector depending on condition of joint and field circumstances. This shall be completed before any striping takes place.

336.2.4.4 Potholes

All utility potholing in existing paved streets shall be done using the vacuum excavation type method. Dimensions for the potholing pavement cuts shall be limited to 12 inch by 12 inch square holes. All potholes shall be backfilled and patched in accordance with MAG Detail No. 212. Backfill material shall be one (1) sack CLSM per MAG Specification Section 728. Asphalt concrete pavement replacement shall use a City approved D-½ (12.5 mm) hot mix design. Asphalt thickness shall be five (5) inch minimum or match existing, whichever is greater. Asphalt shall be placed and compacted in two (2) lifts. The asphalt patch shall be crack sealed afterward.

336.2.4.5 Pavement Replacement

Pavement replacement for open cut trenching, transverse and longitudinal, in any existing paved street, shall be in accordance with MAG Detail No. 200, Type B, with "T"-Top construction. Asphalt materials and placements shall be in accordance with applicable MAG Specifications and as amended by the City. Pavement replacement for arterial and collector type streets shall be one (1) inch thicker than the existing thickness or five (5) inches minimum, whichever is greater. Pavement replacement for residential streets shall be one (1) inch thicker than the existing thickness or three (3) inches minimum, whichever is greater. Asphalt concrete pavement replacement shall use a City approved C-¾ (19.0 mm) or D-½ (12.5 mm) hot mix design. Design mixes shall be submitted for City review and approval. Arterial and collector streets shall be paved using a minimum of two separate lifts; a three (3) inch (minimum) base course, followed by a two (2) inch minimum surface course. Pavement replacement for residential local streets that is a minimum of three (3) inches thick can be paved in one lift. All vertical surfaces (saw/curb edges) shall be tacked. Overnight or bad weather conditions that exist between paving lifts shall also require application of a tack coat. After the final lift of asphalt is in place, all new seams/edges shall be crack sealed with an approved flexible sealant. Testing shall be performed by an independent certified geotechnical testing lab in accordance with these specifications provided for by the utility Owner/Contractor/Developer at their cost. The location and frequency of tests shall be as directed by the City.

When the pavement replacement trench edge is within three (3) feet of the lip of gutter or curb, the full width of asphalt within the area shall be removed and replaced with one (1) inch thicker than the existing pavement.

336.2.4.6 Damage to Property

Damage to any adjacent street facility or structure caused by construction or construction related work shall be replaced or repaired at the Contractors cost as directed by the City before final acceptance of the work by the City.

Any adjacent pavement, concrete or landscaping must be satisfactorily restored/repaired to pre-job conditions to the approval of adjacent property owner

or City of Avondale. This includes traffic loop detectors which must be completely reinstalled if cut. Longitudinal trenching parallel to the road that leaves a 48 inch or less remnant pavement section to lip of gutter or pavement edge, will be required to be replaced as part of the trenching pavement replacement. Sidewalk must be replaced to the nearest joint.

SECTION 340 CONCRETE CURB, GUTTER, SIDEWALK, SIDEWALK RAMPS, DRIVEWAY AND ALLEY ENTRANCE

Subsection 340.1 DESCRIPTION: Is modified to add:

340.1.1 General Requirements

Construction of concrete related improvements shall not begin until the following conditions are met:

A. All underground utility construction including dry utilities shall be complete, including backfill and compaction.

B. All water and sewer services, laterals and stubouts shall be complete, including backfill and compaction.

C. All storm and sanitary sewer invert as-built information shall have been received and approved by the City. See City Sewer Invert Worksheets and related City specification requirements on the City of Avondale website.

D. All related water and sewer utility testing required by the City shall be complete, approved and accepted. All testing results shall pass City requirements.

E. All geotechnical compaction density testing results relating to all underground utility work within City right-of-way and easement areas shall have been received and approved by the City. All testing results shall pass City requirements.

F. Any required material technical data submittals (Concrete Designs) shall have been received and approved by the City.

G. Any required conduit sleeving for utilities, landscaping, etc. shall have been installed. All sleeving conduits under the street improvements shall be Schedule 80 PVC.

H. Letters from all the utility companies shall be provided to the City, stating that all underground installations related to the street right-of-way and easements for the project are complete, and that no additional cross street boring will be required.

I. All required geotechnical testing shall be done in accordance with MAG Specifications and as amended by the City's Supplement to MAG Specifications and Details.

J. City approved technical info submittals are required for all materials used on the project. All materials must match approved submittals exactly or they will be rejected. Any rejected materials shall be removed from the site immediately.

340.1.2 Deficiencies: For various common deficiencies encountered, the required corrective actions are listed as follows:

A. Inverse flows in concrete curb, gutter and valley gutter shall be replaced, no grinding allowed.

B. Incorrect elevations with correct flow direction; grinding may be allowed at the discretion of the City Engineering Inspector as long as it does not exceed ¾ inches in depth and is visually acceptable.

C. Curb, gutter, valley gutter and sidewalk with cracks larger than 1/16 of an inch, regardless of location, shall be replaced from joint to joint.

D. Any deviation in straightness along the top or sides of curb shall not be in excess of ¼ inch when checked with a ten (10) foot straightedge, any curb that does not conform shall be replaced if directed to do so by the City Engineering Inspector.

E. Any deviation or protrusion in the surface of sidewalk (or any other surface designated for use by pedestrians) that may cause a tripping hazard shall be corrected to the City Engineering Inspectors satisfaction.

F. Foreign substances and marks on the concrete surfaces shall be removed completely.

G. Chips, scrapes, gouges and other similar deficiencies may be patched with a City approved epoxy based patching compound, or may require replacement, at the City Engineering Inspector's discretion.

H. Poor or sloppy workmanship may require replacement at the City Engineering Inspector's discretion.

I. As-built elevation differences that exceed ±0.15 feet or longitudinal slope differences of ±0.10 percent that adversely affect the grade shall be reconstructed. No as-built longitudinal slope less than 0.20 percent shall be accepted unless special design criteria was allowed and approved by the City as part of the City approved improvement plans. As-built elevations or slopes that adversely affect the grade, shape, safety or ride-ability of the road, cause water ponding in excess of 0.5 inch in depth or cause concern that the gutters/street

will not drain properly, shall not be acceptable.

Subsection 340.2 MATERIALS: Is modified to add:

340.2.2 Class A Concrete:

Concrete to be used for construction of aprons, valley gutters, right turn/deceleration lanes, paving, sidewalk ramps, commercial driveways and other concrete facilities designed to support vehicle traffic shall be minimum MAG Class A with a fiber mesh strength additive, unless otherwise shown on the City approved plans or specifications.

Subsection 340.3 CONSTRUCTION METHODS: Is modified to add:

340.3.2 Construction Methods (City of Avondale)

Open form inspections are required before placing concrete. It is the Contractor's responsibility to schedule these inspections with the assigned Engineering Inspector a minimum of one (1) business day in advance.

In the case where sidewalk is being installed adjacent to street lights, no sidewalk construction shall begin until either the street lights and the associated electric junction boxes have previously been installed or all street light pole locations and the associated electric junction boxes have been staked by a surveyor. The purpose is to avoid alignment conflicts. The street light locations shall take precedence over sidewalk location and shall not be relocated to avoid a conflict unless written authorization is provided by the City. The sidewalk shall shift or meander around the poles as directed by the City. The same process is required for other possible obstructions such as utility cabinet boxes or pedestals.

Sewer service, lateral or stub locations shall be identified with a stamped "S" into the concrete curb per MAG Standard Detail 440-4. Water laterals, stubs, and services shall also be identified with a stamped "W" into the concrete curb. Locations to be verified and staked by a surveyor prior to curb construction.

Contraction joints spacing for various types of concrete work shall be as follows:

A. Vertical single curb, ribbon curb, vertical curb and gutter – five (5) feet

B. Roll curb - five (5) feet (match joints in sidewalk)

C. Sidewalk – five (5) feet

Sidewalk ramps located at intersections where traffic signals are located, or will be located, may require field fit modifications to allow for proper ADA wheelchair access to the pedestrian push buttons located on the signal poles. Consult with the City Engineering Inspector before constructing these ramps for specific

direction on layout and construction. Form inspections and approvals shall be required before placing any concrete.

A City approved curing agent shall be applied as soon as possible after finishing, especially in hot, dry weather to help prevent cracking.

Related handrail construction shall conform exactly to MAG Standard Detail 145, Type 1 or 4, depending on post locations relative to the structure. Type 2 or 3 shall not be allowed. No variations will be allowed without prior written approval from the City.

For construction inspection purposes, concrete work only as-builts shall be prepared, checked, certified, and submitted by a RLS for City review and approval prior to the start of any actual paving work. Submittal shall consist of two (2) full size black line paper plan sets stamped and sealed by a RLS. Submittal must be complete with all gutter and top of curb as-built elevations provided. Submittals shall include all curb and gutter elevations, valley gutters, aprons, driveway entrances, corner/intersection radii, ECR's and BCR's, concrete bus bays, and concrete right-turn/deceleration lanes. All longitudinal gutter slopes shall be re-calculated including the valley gutters. Cross-street valley gutters shall also be included. Items out of tolerance and any other discovered deficiencies shall be corrected including reconstruction as required prior to starting any adjacent paving construction. Items/areas corrected or reconstructed shall be as-built as outlined above for review and approval by the City for a second time. This inspection submittal process does not replace the required as-built record drawings submittal for the final street improvements. No paving construction shall begin until all related deficiencies are corrected and the City gives written approval for the as-builts.

SECTION 345
ADJUSTING FRAMES, COVERS, VALVE BOXES AND WATER METER BOXES

Subsection 345.1 DESCRIPTION: Is modified to add:

345.1.1 Utility Adjustments:

Any pavement repair resulting from inaccurate location for a valve or manhole adjustment shall be backfilled using one (1) sack CLSM per MAG Specification Section 728 and Section 106.2.3 of the COA Supplement to the MAG Specifications and Details, and the area milled out to a minimum six (6) foot x six (6) foot square x two (2) inches deep and repaved using the same A.C. mix used to originally construct the pavement. All joints to be crack sealed.

Add the following Section as an additional City of Avondale Supplement to the UNIFORM STANDARDS SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION as published by the MARICOPA ASSOCIATION OF GOVERNMENTS

SECTION 399 DRY UTILITIES

399.1 General Specifications

See Section I00 General Conditions for additional requirements.

399.2 Trenching

All staking, trenching, conduit, and installations shall be in accordance with the local utility provider.

399.3 Installation in Right-of-Way

Installation of dry utilities within existing streets, proposed streets, or within five (5) feet shall be in accordance with Section I00, General Conditions, including potholing, street cuts, backfill, and compaction and pavement replacements.

399.4 Compaction

Geotechnical testing for compaction densities is required for all longitudinal and transverse trench crossings within new subdivision developments. Testing and reporting requirements shall be in accordance with Section I00, General Specifications.

399.5 PVC Sleeves

All transverse street crossings in existing and in new streets within City right-of-way shall be sleeved with Schedule 80 PVC pipe unless directed otherwise.

399.6 Air Testing

Low-pressure air testing of all sanitary sewer in accordance with MAG and these specifications shall not begin until installation and backfill of all dry utilities is complete. See Section 600, Sanitary Sewer.

399.7 Water Settling

Water settling methods for compaction and backfill shall only be allowed for new subdivisions and as directed by the City in accordance with Section 100, General Conditions. All trench areas shall be restored to original condition.

399.8 Street Lights

See Section 800 street lights, for specific construction specifications on installation of street light poles and appurtenances.

End of Section

PART 400 RIGHT-OF-WAY AND TRAFFIC CONTROL

SECTION
430
LANDSCAPING AND PLANTING

Subsection 430.4 DECOMPOSED GRANITE AREA delete this section in its entirety and substitute the following:

430.4.1 Scope of Work

Work includes the furnishing of all labor, material, equipment and services necessary to complete the work for this Section as indicated on the drawings and as specified and necessary to complete the construction of decomposed granite groundcover.

430.4.2 Materials

A. Decomposed granite shall be native, local, desert, decomposed granite stone of size ¾ inch diameter minus in all arterial and collector street right-of-way landscaping areas. For properties with the Old Town Avondale Business District the color of the decomposed granite shall be "jesse red", or equivalent. Granite shall be free of organic matter and other debris. The granite colors shall be "brick red", "autumn red" or "madison gold". Actual granite color and size shall be ¾ inch minus and shall be specifically identified on the plans or special conditions. If the size is not clearly specified, the Contractor shall obtain clarification from the City. The Contractor shall submit a five (5) gallon bucket sample of the actual granite to be used on the project. The City must approve the sample before the Contractor spreads the granite on the project area. Any requested deviation from the specified size and/or color must be approved by the City.

B. Chemical herbicide shall be industrial grade "Surflan" pre-emergent, or other City approved equal.

430.4.3 Surface Preparation

A. The existing grade shall be fined graded and raked free of organic matter and other debris one (1) inch diameter and larger. A level board not less than eight (8) feet in length shall be used to inspect subgrade for accuracy and trueness. All weeds and grass shall be completely removed. All trench and plant excavation must be completed prior to fine grading. All excavations must be properly and thoroughly compacted as to prevent any future settlement. All grades adjacent to curbs, sidewalks or headers shall be at 2½ inches below the

top of concrete unless directed otherwise. Turndown excavations are not acceptable.

B. Subgrades shall be inspected and approved by the City or designated representative prior to the Contractor spreading any granite material.

430.4.4 Decomposed Granite Installation

Installation procedures for decomposed granite may vary by the scale of the project and the size of specific areas to receive decomposed granite groundcover. Installed granite shall be dragged or raked to remove any irregularities. Installation shall provide a compacted depth of two (2) inches decomposed granite as specified on the drawings. Methods of compacting such as rolling, water settling, etc., shall be approved by the City or designated representative. A level board not less than eight (8) feet in length shall be used to inspect grade for accuracy and trueness. Granite finish grade shall be ½ inch below the top of curb, sidewalk or header surfaces, unless otherwise specified on the drawings.

430.4.5 Weed and Grass Control

A. Application of commercial grade chemical herbicide pre-emergents shall be at the rate and method recommended by the manufacturer and in accordance with local accepted standards. Material shall be applied in solution with water in the proper proportions as recommended by the manufacturer. The Contractor, sub-Contractor or individual performing the actual spraying operation, chemical application and transportation of these chemicals shall be properly and currently licensed/permitted as required by any applicable federal, state or local regulations and statutes.

B. Two (2) separate applications shall be done, one being after completion of fine grading before the granite, and the second application being done after the granite is placed.

C. The Contractor shall be responsible for the proper removal of any existing weeds or grass. At the beginning of the contract work, or no less then ten (10) days before fine grading is started, the Contractor shall correctly apply a commercial chemical herbicide as recommended by the manufacturer to any unwanted weeds and grass as so directed by the City. Grading only is not acceptable for weed and grass elimination. Spray application of the herbicide shall be done sufficiently prior, ten (10) days minimum, before any manual removal of the grass and weeds is to take place. The Contractor shall not begin finish grade work until all weeds and grass is removed or the existing growth shows visible evidence of being treated with an herbicide.

430.4.6 Cleanup

The Contractor shall remove and properly dispose of any and all debris and waste materials developed as a result of the work in this Section. All paved surfaces shall be clean of dirt or granite upon completion of this scope of work.

430.4.7 Maintenance and Guarantee

Areas of granite shall be maintained free of weeds and grass, free of other debris and true to grade until final acceptance and until completion of the maintenance period.

Subsection 430.5 TREES, SHRUB, AND GROUND COVER PLANTING: delete this section in its entirety and substitute the following:

430.5.1 Proof of Material Purchased

All shipments or orders of plant material shall be inspected at the nursery or at the growing site by the authorized federal and state authorities. All necessary inspection certificates as may be required by law for the necessary transportation shall accompany the invoice for each shipment or order of stock and shall be filed with the Contractor prior to acceptance of the materials.

430.5.2 Materials

A. Humus: Shall be approved forest humus or other approved organic material free from sticks, stones, roots, or other foreign matter.

B. Material for Staking: Stakes shall be two (2) inch x two (2) inch x eight (8) foot redwood or two (2) inch diameter x eight (8) foot lodge pole pine free of any knots or defects. The tree planting standard detail drawing may vary the staking material requirements. The standard details for staking prevail.

- Wire for fastening trees to stakes shall be No. 12 gauge, annealed galvanized steel, not iron.
- Hose to encase wires used for fastening trees to stakes shall be two (2) ply reinforced rubber or plastic garden hose in lengths of six (6) inches.
- Staples shall be a #14 gauge, one (1) inch long, blued or zinc coated.

C. Prepared Backfill: Shall be composed of three (3) parts of native soils to one (1) part of humus by volume, thoroughly mixed to insure uniformity. Native soil shall be natural, fertile, friable soil, which possesses the characteristics of representative productive soils in the vicinity. The soil used shall not be excessively acid or alkaline, nor toxic substances harmful to plant growth. The soil used shall be without admixture of subsoil, and be reasonably free of noxious weeds, clay lumps, clods, stones, roots, stumps, and foreign debris of any kind.

D. Water: used in planting shall be kept free from oil, acids, alkali, salt and other substances harmful to plant growth.

430.5.3 Plant Materials

A. All plant materials furnished shall be nursery-grown, well branched, and well-proportioned unless otherwise indicated. All plants are subject to inspection and approval by the City before planting. All plants found unsuitable in growth or condition, or which are not true to name, or meet the City materials. Call per requirement shall be removed at the expense of the Contractor and replaced with acceptable plants.

B. Nomenclature: Durable, legible labels in weather resistant ink, shall be provided for ease of inspection and identification. The label detailing the correct plant name and size shall be securely attached to all plants, bundles, and containers of plant material delivered to the site.

C. Quality and Size: Plants shall be in accordance with the latest industry accepted nursery grading standards. All plants shall have a normal habit or growth and shall be sound, healthy, vigorous, and free from disease and insect infestations. Trees shall have a straight trunk throughout their height. Any tree with a weak, thin trunk not capable of supporting itself when planted in the open shall not be accepted. The minimum acceptable size of all plants measured before pruning with branches in normal position, shall conform to the measurements specified within the plant list. Plants larger in size than specified may be used, but the use of larger plants will not affect the contract price. If larger plants are used, the ball of earth or spread of roots shall be increased proportionately.

D. Container-grown Plants: Shall have been grown in pots, cans, tubs, or boxes for a minimum of three (3) months and a maximum of one (1) year. They shall have sufficient roots to hold earth intact after removal from containers, but shall not be rootbound. Plants shall be carefully removed from containers so as to prevent breaking or cracking of earth during the planting process.

430.5.4 Plants Required

A. The species (scientific and common names), sizes, manner in which to be furnished, and the approximate number required, are to match the plant list on the plans and specifications. The Contractor shall furnish and install all plant material necessary to complete the planting as shown on the landscape plans or as directed by the City.

B. Substitutions: Plant kinds other than those indicated on the plant list will be considered by the City only upon submission of proof that the plant is not

reasonably procurable in the local region and upon prior authorization of essential characteristics as the kind of plant specified in regards to appearance, ultimate height, shape, habit of growth, general soil, and other requirements. The average cost and value of the substituted plants shall not be less than the cost and value of plants indicated. All substitutions of plants must be submitted in writing at least five (5) days prior to the bid opening date. Approval of the substitution must be acknowledged by the Owner in writing before approval is granted.

C. Protection After Delivery: All nursery stock shall be planted as soon as possible after delivery to the site. Plants shall not be exposed to excessive sun or drying winds until planting. Stock, which is not satisfactory in the opinion of the Owner, shall be immediately removed from the site at the Contractor's expense and replaced with acceptable stock.

D. All Plants shall be in accordance with the City of Avondale approved plant list in the Avondale City Code Section 12, Appendix A, Low Water Using Plant List.

The following tree varieties shall be prohibited:

- Mulberry trees
- Olive trees with the exception of the Swan Hill or Wilson Olive varieties

E. All trees required by this part shall have a minimum trunk height of six (6) feet, with a minimum 1½ inch caliper measured four (4) feet above the ground. Multi-trunk trees may have smaller average caliper measurements. Palms shall have a minimum trunk height of five (5) feet. This size of tree is generally referred to as "fifteen (15) gallon" in the landscaping industry.

F. Twenty-four inch box trees shall have a minimum trunk height of eight (8) feet with a minimum two (2) inch caliper measured four (4) feet above the ground. Multi-trunk trees may have smaller average caliper measurements. Palms shall have a minimum trunk height of eight (8) feet.

430.5.5 Planting Season

The planting of trees and shrubs shall be performed during favorable weather conditions, during the season or seasons, which are normal for such work, or as determined by acceptable local practice.

430.5.6 Streetscape standards – The following landscaping shall be required along all streets:

A. Trees with a minimum size as specified herein shall be planted at the rate of one (1) tree per 20 feet of linear street frontage. A minimum of 25 percent of the required trees shall be 24 inch box trees.

B. Shrubbery with a minimum size of five (5) gallons shall be planted in appropriate numbers to complement the placement of trees, but in no case shall be less than two (2) shrubs per 20 feet of linear street frontage.

C. Clustering of trees and shrubbery shall be encouraged to accent focal points or landmarks and to provide variety to the streetscape. Contouring of the ground and placement of mounds and earth berms along streets shall be required.

430.5.7 Obstructions Below Ground

Any rock or other underground obstructions shall be removed by the landscape Contractor to the depth necessary to permit proper planting according to plans and specifications. Other locations for the planting may be selected by the Contractor upon approval of the City if underground construction, obstructions, or rock are encountered in the excavation of planting areas. The Contractor must be knowledgeable of locations of all existing underground utilities prior to any work. Their protection is the responsibility of the Contractor. All damage shall be corrected at the expense of the Contractor to the satisfaction of the City or respective utility company.

430.5.8 Planting Operations

A. The Contractor shall be responsible for finish grading the landscaped areas. This may require removing or adding material to achieve an acceptable grade.

B. Plant Locations: Trees and shrubs in containers will be placed in accordance with the planting plans for location approval by the City prior to planting.

- Planting shall not be placed so as to block visibility of traffic signs or street signs, including as the plants and trees are projected to grow to full growth.
- Planting within sight visibility triangles shall be restricted to shrubs no taller than two (2) feet at full growth and trees with branches hanging no lower than seven (7) feet.

The planting Contractor shall stake the plant locations as required to coordinate the planting work with the irrigation work. Trees will be planted a minimum of five (5) feet from adjacent curbing or sidewalks unless directed otherwise. Shrubs will be planted a minimum of 2½ feet from adjacent curbing or sidewalks unless

directed otherwise. These perimeter spacing requirements shall take precedence over the planting plans. Shrub clusters shown on the planting plans are for general quantity, location and layout style purposes only. Actual shrub spacing shall be at a minimum of four (4) feet from any plant in any direction unless directed otherwise. Location of plants on the planting plan shall take precedence over plant locations on the irrigation plan. If prior to or during the planting operation, the Contract encounters any obstructions, space restrictions, or other circumstances which may require shifting or relocation of plant locations, or addition/subtraction of individual plants, the Contractor shall notify the City of the specific problem for direction and approval. Failure to comply with these spacing requirements may result in removal, replacement, and replanting of the plants at the Contractor's expense.

C. Excavation for Planting: This shall include the excavation and stockpiling of native soil. Planting pits shall be excavated to a volume twice the size of the rootball of the plant to be planted.

D. Base Backfill: If required, base backfill of the pit bottom shall be backfilled with prepared backfill material and be water settled to eliminate any future settlement of the plant.

E. Setting Plants: Plants shall be carefully removed from containers and set in a manner as to assure that the rootball remains intact as a part of this operation. Plants shall be set plumb and faced to give the best appearance in relation to adjacent plants or structures. Trees shall be braced in position until backfilling operations are complete.

F. Final Backfill and Fine Grading: Backfilling operations of planting pits shall be completed with prepared backfill material. The soil shall be thoroughly tamped and water settled to eliminate all voids in the backfill while maintaining the plumb position of the plant. The wells shall be graded and the planting area shall be fine graded.

G. Staking of Trees: Staking shall be as described on the standard detail drawings. The Contractor may provide additional staking upon approval of the City for trees not meeting the specification of being self-supporting. Unless directed otherwise, all 15 gallon trees shall be staked.

H. Pruning: Plants shall be pruned of superfluous growth after planting as directed by the City.

I. Fertilization: All plant material shall receive proper application of an approved root stimulator and/or plant food additive as recommended by the manufacturer. Applications shall be made during and after planting, throughout the construction period before acceptance, and during any prescribed

maintenance period after acceptance. Approvals by the Owner or Landscape Architect do not relieve the Contractor from any liability for plant responsibility.

J. The Landscape Contractor shall be responsible for protecting new plants from rabbits and any other animals during construction and through the specified maintenance period.

K. Planting wells: All tree and shrub plants shall be installed in a graded irrigation well. Wells for shrubs shall be two (2) inches deep and 24 inches in diameter, around the shrub. Wells for trees shall be two (2) inches deep and 36 inches in diameter around the tree. The top of the irrigation bubbler shall be installed to a maximum height of two (2) inches above the bottom of the well's finish grade. The one bubbler for each shrub shall be spaced approximately four (4) to six (6) inches from the plant. The two bubblers for each tree shall be spaced approximately ten (10) inches to 12 inches from the plant, one on each side, in line with the plant center.

430.5.9 Cleanup

Any soil, manure, or other material dropped onto paved areas by hauling operations or otherwise, shall be removed promptly, keeping these areas clean at all times. All excess soil, stone, and debris created under this scope of work shall be removed from the site or disposed of, as directed by the Owner.

430.5.10 Inspections

The City or its designated representative shall perform the required jobsite, yard, and plant nursery inspections as outlined in the Project Plans/Specifications. A minimum two (2) business days notice is required. The Contractor shall be required to have an authorized person present at both the substantial and final completion inspections. The City and/or its designated representative reserve the right to make any unscheduled or unannounced inspections or jobsite visits.

430.5.11 Maintenance Period

A. The maintenance period shall begin after the substantial completion inspection and punch list items are completed. Substantial completion is defined as all grading, irrigation and planting work being completed including any structures, electrical appurtenances, irrigation controllers, security cages and granite groundcover. The start date for the maintenance period shall be approved by the City and put in writing. An additional inspection may be required to verify completion of punch list items.

B. During the maintenance period, the Contractor shall maintain all trees, shrubs, and ground cover. The maintenance shall include all labor, equipment, and materials required for the irrigation, weeding, grading, staking, and general

care to ensure the healthy growth of all plants. The Contractor shall make timing and flow adjustments to the irrigation system as required to properly establish and maintain the plant material through the construction and maintenance periods. The Contractor shall be responsible for all irrigation repairs when such repairs are required for the maintenance operations. When the maintenance period is completed, a final completion inspection shall take place. The job will not be accepted until the final completion inspection is done and all resulting final punch list items are corrected. The City shall approve the final acceptance and issue a written document stating final acceptance of the job and the date of acceptance.

C. The Contractor's maintenance period shall be for one (1) calendar year from the Owner approved date of substantial completion.

430.5.12 Plant Guarantee and Replacement

A. Guarantee: The Contractor shall guarantee all shrub material to be in vigorous, healthy condition for a period of one (1) year from the Owner approved date of substantial completion. All trees shall be guaranteed to be in vigorous, healthy condition for a period of one (1) year from the Owner approved date of substantial completion.

B. Replacement: Any plant under this specification which is dead, missing, unhealthy, or otherwise not acceptable and not in a satisfactory growing condition during the construction, maintenance period, or at the end of the guarantee period, shall be removed from the site and replaced with a suitable, acceptable plant as specified within five (5) days.

C. Plant protection for protection services: Permit from Department of Agriculture for protected species affected, removed or salvaged by construction.

SECTION
440
SPRINKLER IRRIGATION SYSTEM INSTALLATION

Delete this section in its entirety and substitute the following:

440.1 Examination and Verification of Drawings and Site

It shall be the Contractor's responsibility to report to the City any deviations between mechanical drawings, specifications and the site. Failure to do so prior to the bid date and prior to installation of equipment, resulting in replacing and/or relocating equipment, shall be done at the Contractor's expense.

440.2 Materials

The specifications shall be deemed to be used for the purpose of facilitating a description of the materials and establishing quality whenever any material is specified by name and/or number, and shall be deemed and construed to be followed by the words "or approved equal". Substitutions will not be permitted which have not been submitted for prior approval by the Owner. All materials shall be new and the best of their class and kind. Sufficient descriptive literature and samples must be furnished for any materials submitted as "equal" substitutes.

440.3 Permits and Inspections

A. Any permits required for the installation or construction of any irrigation work included under this Contract shall be obtained and paid for by the Contractor. The Contractor shall also arrange for and pay all costs in connection with any inspections and examinations required by the permitting authorities.

B. The Contractor shall notify the Owner at least two (2) business days in advance of the time when inspection of the irrigation system work is required.

440.4 Polyvinyl Chloride (PVC) Pipe

A. Plastic pipe shall be as described and specified on the drawings. It shall be of unplasticized PVC compounds extruded from virgin parent materials. PVC pipe shall be newly purchased with no visible evidence of extended direct sun light exposure. Pipe shall be free from dents, cracks, holes, or other abrasions. All pipes shall be manufactured by an approved manufacturer.

B. All pipes shall be continuously and permanently marked with the following information: Manufacturer's name or trademark, size, schedule or class, PVC physical property value, testing standards designation, and maximum working pressure psi at 73.4 degrees Fahrenheit.

C. Mainline pipe is defined as all pipe installed from the source, such as a meter, curb stop or backflow prevention assembly, to a mainline valve or lateral valve as defined on the plan drawings. Mainline pipe upstream from the backflow preventer and between the water meter and the backflow device shall be Type K copper tubing. High pressure mainlines three (3) inches and larger shall be C-900, Class 200, rubber gasket, bell and spigot pipe with push-on or mechanical joint D.I.P. fittings as specified. Standard mainline pipe downstream from the backflow preventer sizes ¾ inch to 2½ inches diameter shall be Schedule 40 solvent weld.

D. Lateral pipe is defined as all non-pressurized pipe installed downstream from the control valves and that which distributes water to the bubblers, emitters

and sprinklers. Lateral pipeline sized ¾ inch to 2½ inch diameter shall be Class 200, solvent weld. ½ inch diameter lateral pipe shall be Class 315, solvent weld. Lateral line pipe sizes three (3) inches in diameter and larger shall be Class 160, rubber gasket, bell and spigot.

440.5 Plastic Pipe Fittings and Connections

A. All plastic pipe fittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for either solvent weld or threaded connections. No fittings made of other materials shall be used. Fittings shall be marked with manufacturer's name, size, and schedule information.

B. Slip fittings socket taper shall be so sized that a dry unsoftened pipe end conforming to these special provisions can be inserted no more than half way into the socket. Unless otherwise specified, all plastic fittings shall be of Schedule 40 or Schedule 80 PVC material.

C. All plastic to metal joints shall be made with PVC Schedule 80 male adapters or PVC Schedule 80 nipples. Threaded joints for such connections shall be made up with teflon ribbon tape.

D. Primer and solvent cement for socket connections of PVC material shall be compatible with material to be welded as recommended by the plastic material manufacturer.

E. All plastic to plastic threaded connections shall be made up with teflon based joint compound such as Permacel, Rectorseal 5 or approved equal.

F. Fittings for PVC bell and spigot pipe with gasket shall be mechanical joint or push-on ductile iron pipe as specified and conforming to the applicable AWWA standards.

440.6 Copper Pipe and Fittings

A. Copper tubing shall be seamless, Type K, hard drawn temper.

B. Fittings shall be wrought copper or brass solder joint unless specified otherwise. Solder joints shall be made using alloy grade Sb5, 95-5 tinantimony with a rosin type flux. Joints between dissimilar metal shall be made using threaded, insulating fittings. Threaded joints shall be made up with teflon ribbon tape or teflon based joint compound.

440.7 Bubblers and Risers

All bubblers and riser assemblies shall be of the types and sizes specified on the plans. Bubbler emitters for trees and shrubs shall be Rainbird or other City approved equal. All bubbler risers shall be made up of ½ inch Flex PVC tubing with ½ inch male adapters.

440.8 Equipment

A. The irrigation controller shall be of the size specified on the plans. The irrigation controller shall be the light-energized Solatrol LEIT irrigation control computer or other City approved equal.

B. The lateral line valves shall be; diaphragm-operated, electrically actuated, to be used in conjunction with the Solatrol LEIT or other City approved equal controller. Valve sizes shall be as indicated on the plans.

C. The backflow prevention device/assembly shall be of the type and size specified on the plans. Brass bodied, threaded ball shut-off valves are required before and after the actual backflow device. A threaded union shall be installed on the downstream side of the backflow device in-line with the pipe, perpendicular to the ground. The entire backflow prevention assembly shall be installed per the latest applicable City codes.

D. All mainline shut-off valves shall be threaded brass bodied gate valves. Gate valves shall be a domestic brand, Nibco, Grinnell, Waterous, or approved equal. Location and size shall be as indicated on the plans.

E. Any main line taps shall be performed by the Contractor. The meter shall be furnished and installed by the City.

440.9 Irrigation Control Cable

A. All wiring to be used for connecting the automatic controller to the electric solenoid actuated control valve shall be Type UF-600V, 7 strand or solid copper, PVC insulation, single conductor, UL approved underground feeder cable. All "hot" wires are to be one color and all "common" wires are to be of another color. All wiring to the solenoid valves shall be installed in the irrigation mainline trench, along side the pipe.

B. Connectors shall be a waterproof type such as manufactured by Pentite, or other City approved equal.

C. Solatrol special low-voltage cable shall be used in conjunction with the Solatrol light energized LEIT irrigation controller system.

D. Any wiring to be installed under concrete or asphalt shall be sleeved separately using Schedule 80 PVC pipe. This is for locations under existing conditions or future conditions as specified on the plans. Sleeve sizes and lengths shall be noted on the plans. Any wire splicing, other than at the controller or solenoid valves, shall be done in a grey, rectangular plastic junction box, visible and flush with the final grade. The lid of the junction box shall be marked "IRR. ELECTRIC". The base of the junction box shall be set in pea gravel. Lid shall be a bolt down model, Carson or approved equal.

E. Irrigation controller wire is to be installed along side mainline piping, joint trench.

440.10 Trenching

A. All main lines shall have a minimum cover of 15 inches, and all lateral lines shall have a minimum cover of eight (8) inches based on finish grades unless otherwise indicated on the plans. Sprinkler lines connecting rotor pop-up sprinklers shall be installed with a minimum cover of 15 inches based on finish grades.

B. Alignment of pipe shall be for a simple layout with pipe running parallel or perpendicular to features such as curbs, sidewalks, and buildings as may be possible with onsite conditions.

C. The intent of the irrigation pipe drawings is to show the general layout schematic of the water distribution. The tree and shrub layout shall govern the actual pipe and sprinkler locations.

440.11 Installation of Plastic Pipe and Fittings

A. Plastic pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacture.

B. Plastic pipe shall be cut with the proper saw or tubing cutters in a manner so as to ensure a square cut. Burrs at cut ends shall be removed prior to installation so that smooth unobstructed flow can be obtained.

C. Solvent welded connections shall be made using primer and solvent cement compatible with pipe. Pipe sizes up to and including 2½ inch diameter shall be primed prior to the application of the solvent. Pipe shall be fully inserted in all sockets.

D. Permission to cut or break sidewalks, concrete, or asphalt shall be obtained from the Owner. Where piping on the drawings is shown under paved areas, but running parallel and adjacent to planted areas, the intent of the drawings is to install the piping in the planted area.

E. All pipes in rocky soils shall be thoroughly bedded in sand or approved backfill material.

F. Any irrigation pipe to be installed under concrete or asphalt shall be sleeved using schedule 80 PVC pipe. This is for locations under existing conditions or future conditions as specified on the plans. Sleeve sizes and lengths shall be as noted on the plans. Sleeves for irrigation pipe shall not be used simultaneously for controller electric wires. Sleeves for the controller electrical wires shall be done separately.

440.12 Installation of Copper Pipe

A. All copper tubing shall be cut squarely and accurately to measurements established by the Contractor and shall be worked into place without forcing. Proper provision shall be made for expansion and contraction of all tube lines. Proper fittings shall be used at all changes of direction.

B. All copper tubing shall be cut with square ends with all burrs removed. Tubing shall be handled and protected carefully. All tubing cut, dented, or otherwise damaged shall be replaced with new tubing at the Contractor's expense. All pipe to fitting connections shall be properly prepped with a wire brush or abrasive cloth tape. Flux shall be applied to both surfaces to be joined. Tubing shall be inserted to the full depth of the fitting, and then soldered.

C. Where copper pipe is to be installed in or through concrete, the pipe shall be wrapped with protective tape or coated with a protective coating. Where copper pipe is installed through concrete walls, slabs, or structures, the copper pipe shall be sleeved. The area between the sleeve and pipe shall be caulked.

440.13 Thrust Blocks

Concrete thrust blocks shall be provided on all pressure pipelines three (3) inches and larger with non-restrained joints. The thrust blocks shall be located at all fittings including valves, tees, stub-outs and bends greater than 22.5 degrees. The concrete shall be 3,000 psi and shall be placed against properly dampened, undisturbed soil, centered on the thrust resultant line.

440.14 Installation of Equipment

A. Irrigation Controllers shall be installed as shown on the plans and per manufacturer specifications. All electrical connections and distribution shall be per local applicable codes. The electric service supply to the controller shall be installed in conduit. Control valve solenoid wires, located above ground, shall also be installed in conduit.

B. Backflow prevention assemblies shall be installed in a protective rectangular box steel cabinet. The cabinet shall be built of light gauge steel materials with welded construction. Spanded steel shall be used for the top and sides of the box. Angle steel shall be used for the top perimeter and side corners. See standard detail drawing. Cabinet dimensions shall accommodate the size of the backflow prevention assembly. Dimensions shall be as noted on the plans, details or field determined. The cabinet shall be mounted on a four (4) inch thick concrete pad. The steel protective cabinet shall be attached to the base utilizing a detachable mechanism with lock down provisions. See standard detail drawing. The Owner shall provide the required locks. The waterlines to and from the backflow prevention device shall come up through the concrete pad through PVC sleeves.

C. All exposed metal including welds shall be coated with a red oxide type primer. All bare metal surfaces shall be free of rust, oil, dirt, foreign substances and moisture prior to application of the primer coat. All primed metal shall be allowed to dry completely. All primed surfaces shall be painted with medium dry industrial enamel. Primed surfaces shall be properly prepared according to the paint manufacturer's instructions. The Contractor shall follow the manufacturer's directions concerning external conditions, temperature, application methods and thinning procedures. The paint shall be of a flat finish, exterior type and desert beige in color unless directed otherwise. The Contractor shall submit a paint chip sample to the Owner for approval before any paint is to be applied. The Contractor shall allow any painted surface/item to dry completely before handling.

D. Irrigation controllers that require a metered 120 volt electric service shall have a separate wall or pedestal mount meter cabinet. The meter cabinet shall be installed next to the irrigation controller. The Contractor shall provide a stamped metal address identification tag, riveted to the meter cabinet. The meter cabinet shall be painted to match the irrigation controller and backflow prevention cabinets. Pedestal meter cabinets shall be in a concrete pad with a copper ground rod. The Owner shall provide the Contractor with the meter service address.

E. Irrigation controllers requiring 110 volt service shall be installed inside a protective metal cabinet mounted on a concrete pad.

F. The Contractor shall provide a circuit breaker panel for each irrigation controller, to be located alongside the controller, installed in the same protective cabinet.

G. The Contractor shall construct and install all irrigation controllers and all associated electrical equipment per local applicable codes including the local electric power utility providing service. The Contractor shall be responsible for scheduling and arranging all necessary inspections for electric power related

items with the local power utility company and the City of Avondale Building Inspection Division. All permits and inspections shall be paid by the Contractor and included in the cost of the irrigation.

H. Light-energized irrigation controller shall be installed in a protective metal cabinet constructed of the same materials. The post type controller, such as the Solatrol LEIT, shall have its PVC mounting pole placed inside a steel pipe with steel plates at both ends. One plate is to be mounted to a concrete pad and the other will have an expanded steel, detachable cage, to protect the actual controller on top. See standard detail drawing.

I. Solenoid valves for lateral lines shall be installed as per manufacturer's directions. All Solenoid valves shall be installed in an 11 inch x 17 inch x 12 inch deep, green, PVC rectangular valve box with a non-hinged, bolt down cover. Carson Model Series 1419B. All valve boxes shall be installed flush with the finished grade granite surface and installed in a pea gravel base. Valve box lids shall be marked "Irrigation Control Valve".

J. All manual operated, main line irrigation gate valves shall be installed in a round ten (10) inch diameter x ten (10) inch deep, green, PVC valve box with a non-hinged, bolt down cover. Carson Model Series 910. All valve boxes shall be installed in a pea gravel base and be flush with the finish grade.

K. Other equipment such as pressure regulators, filters, and fertilizer applicators shall be installed in rectangular PVC valve boxes. If more than one piece of equipment is to be installed in one valve box, a larger box may be required. The plans will show if equipment is to be combined in one valve box. If not directed, the Contractor shall assume to use one separate valve box for each piece of equipment.

440.15 Flushing and Testing of Plastic Pipe

A. Irrigation main lines shall be tested in place before backfilling for a period of not less than one hour, and shall not show any loss of water through fittings. Pressure shall be static line pressure. The Contractor shall notify the City in two (2) business days prior to testing for a visual inspection of the explored mainline. Pipe may be center loaded but all joints must be uncovered for testing and inspection. Lateral lines shall be visually inspected only prior to system flushing.

B. Control valves shall be opened and a full head of water used to flush out the system after all new sprinkler piping and risers are in place and connected, and all necessary division work has been completed and prior to the installation of sprinkler heads. Heads shall be installed after the system is thoroughly flushed.

440.16 Backfilling

A. The main shall be pressure tested prior to backfilling. Backfilling of trench before testing shall be completed at the Contractor's risk. The City reserves the right to have any or all pipe excavated as is required to determine the size, quality, and/or water-tight integrity at the expense of the Contractor.

B. Contractor shall water settle trenches and provide rough grade to match the grade conditions prior to the work as a part of this Section.

440.17 Installation of Irrigation Heads and Risers

A. All irrigation heads shall be set perpendicular to finished grades unless otherwise designated on the plans.

B. All irrigation heads adjacent to existing walks, curbs, or other paved areas, shall be set to grade. Rotor pop-up sprinkler heads, which are to be installed in lawn areas where the turf has not yet been established, shall be set four (4) inches above the proposed finished grade. Heads installed in this manner will be lowered to grade by the Contractor when the turf is sufficiently established to allow walking on it without appreciable destruction.

C. All irrigation heads containing adjustable pin nozzles shall have the pins adjusted for adequate and proper distribution.

D. All nozzles on stationary pop-up sprinklers shall be tightened after installation. All sprinklers having an adjustment stem shall be adjusted on a lateral line for the proper radius, diameter and/or gallonage.

E. Sprinkler heads and risers shall conform to details and descriptions on the drawings.

440.18 Installation of Bubblers and Risers

A. Bubbler and riser assemblies shall be installed as shown on the plans. Coordination of bubbler installation with planting is a requirement.

B. Bubblers shall not be assembled to the riser until flushing is completed. Care shall be taken prior to bubbler installation and pipe kept free of foreign matter after flushing and prior to emitter installation.

C. All bubblers are to be located in the planting wells. Each shrub shall have one (1) each 0.25 GPM installed four (4) to six (6) inches from the plant. Each tree shall have two (2) each 0.5 GPM installed ten (10) inches to 12 inches from the plant, one on each side, in line with the center of the plant. The top of the

irrigation bubbler shall be installed to a height of two (2) inches above the bottom of the tree well finish grade.

D. Risers for bubblers shall be ½ inch PVC Flex pipe and male adapters. One-half (½) inch solvent weld 90 elbows or tees shall be used to transition from the lateral PVC pipe to the ½ inch PVC Flex pipe.

440.19 Warranty - Guarantee

Warranty shall be for a period of one (1) year from acceptance by the Owner.

440.20 Maintenance

A. The Contractor shall maintain the system in proper working order for a period of one (1) year from the City approved date of substantial completion.

B. Maintenance shall include the setting of irrigation heads to proper finish grades after turf has been established.

C. Maintenance shall include any bubbler/riser adjustments required to allow the irrigation system to operate properly.

D. Maintenance shall include any necessary irrigation controller adjustments to the watering timetable during the one (1) year period.

E. Maintenance shall include any and all repairs due to an irrigation pipeline break. This is to include erosion damage, plant replacement, granite replacement, grading, irrigation repairs and any damage to adjacent concrete, AC pavement, fences, etc., as a result of the flooding and/or erosion caused by the irrigation break. Erosion repair due to over watering shall be the Contractor's responsibility. All maintenance repairs are to be paid at the Contractor's expense.

F. At the end of the maintenance period a final completion, onsite walk-through inspection shall take place between the City, Landscape Architect, and Contractor. Any missing and/or damaged bubblers and/or risers shall be replaced at the Contractor's expense.

440.21 Operation and Maintenance Instruction

The Contractor shall instruct or provide for instruction of all operation and maintenance procedures for all equipment including but not limited to; irrigation controller, backflow preventer, manual valves, solenoid valves, electric service disconnects, circuit breakers, pressure regulators, fertilizer applicators, bubblers and sprinklers.

440.22 Operation and Maintenance Manuals (O&M)

The Contractor shall provide three (3) sets of Operation and Maintenance Manuals for applicable equipment to the City if the landscaping is in the median or homeowners association for all other locations. The O&M manuals shall include general information and specifications for all equipment including valves and valve boxes. Actual model numbers, dimensions and sizes shall be noted if applicable.

End of Section

PART 500 STRUCTURES

No City of Avondale Changes

PART 600 WATER AND SEWER

SECTION
601
TRENCH EXCAVATION, BACKFILLING AND COMPACTION

Subsection 601.1 DESCRIPTION: Is modified to add the following paragraph to the end of the section:

The pipe zone shall be known as the zone from the bottom of the trench through the upper limits of bedding. The pipe zone shall be constructed in two lifts for all water and sewer lines. The bottom lift shall consist of the foundation layer. The top lift will include the placement of all other material in the pipe zone. For City fiber optic and telecommunication conduits the pipe zone shall be constructed in one lift.

Subsection 601.4 FOUNDATION, BEDDING, BACKFILL, AND COMPACTION: Is modified as follows:

601.4.1 FOUNDATION: Delete this section in its entirety and replace with the following:

For sanitary sewer lines the foundation shall be the layer from the bottom of the trench to the bottom of the pipe. The foundation layer for sewer lines shall consist of the placement of sand material in accordance with ASTM D-2321 and that is acceptable to the City.

For all water lines the foundation shall be the layer from the bottom of the trench to the top of the pipe haunch. The pipe haunches shall be hand formed as necessary to assure adequate compaction. The foundation layer for water lines shall consist of the placement of Aggregate Base Course (ABC) in accordance with MAG Section 702, Table 702-1.

For fiber optic and telecommunications conduit the foundation material shall be one (1) sack CLSM per MAG Section 728.

Mechanical compaction is the accepted method to compact the foundation layer for sanitary sewer and water. Where applicable, the moisture content for mechanical compaction shall be that for which the specified compaction can be obtained. Mechanical compaction shall occur in lifts not to exceed one (1) foot. The foundation layer shall be constructed in one (1) lift. Inspection of the in-place foundation layer is required by a City of Avondale Engineering Inspector.

Alternatively, water settling is allowed for compaction of the foundation layer for sanitary sewer lines only. Specifications for water settling can be found in the

most recent version of MAG and the City of Avondale Supplement to MAG in Sections 601.4.5. The foundation layer shall be constructed in one (1) lift. Inspection after placement of the foundation lift by a City of Avondale Engineering Inspector shall be required.

No compaction is required for City fiber optic and telecommunication conduit as the pipe zone shall be backfilled with CLSM.

601.4.2 BEDDING: Delete the section in its entirety and replace with the following.

For sanitary sewer lines the bedding layer shall be the area from the top of the foundation layer to a point at least 12 inches above the pipe. The bedding layer for sewer lines shall consist of the placement of Sand in accordance with ASTM D-2321.

For all water lines the bedding layer shall be the area from the top of the foundation to a point a minimum of 12 inches above the pipe. The bedding layer for water lines shall consist of the placement of ABC in accordance with MAG Section 702, Table 702-1.

For fiber optic and telecommunications conduit the foundation material shall be one sack CLSM per MAG Section 728. The bedding layer shall extend to a point a minimum of six (6) inches above the top of pipe.

Mechanical compaction is the accepted method to compact the bedding layer for sanitary sewer and water. Where applicable, the moisture content for mechanical compaction shall be that for which the specified compaction can be obtained. Mechanical compaction shall occur in lifts not to exceed one (1) foot. The bedding layer shall be constructed in one (1) lift subsequent to the approval of the foundation lift. Inspection of the in-place bedding layer is required by a City of Avondale Engineering Inspector.

Alternatively, water settling is allowed for compaction of the bedding layer for sanitary sewer lines only. Specifications for water settling can be found in the most recent version of MAG and the City of Avondale Supplement to MAG in Sections 601.4.5. The bedding layer shall be constructed in one (1) lift. Inspection after placement of the bedding lift by a City of Avondale Engineering Inspector shall be required.

No compaction is required for City fiber optic and telecommunication conduit as the pipe zone shall be backfilled with CLSM.

601.4.3 BACKFILL: Delete this section in its entirety and replace with the following:

For sanitary sewer lines and water lines to be constructed within five (5) feet of the existing roadway parallel to the direction of traffic flow the backfill area is comprised of the area necessary to fill the trench/T-top zone from the top of the bedding layer through the top of subgrade. The backfill material shall be ABC per MAG Section 702, Table 702-1.

For sanitary sewer lines and water lines that are to be constructed within five (5) feet of the existing roadway perpendicular to the direction of traffic flow the backfill area is comprised of the area necessary to fill the trench/T-top zone from the top of the bedding layer through the top of subgrade. The backfill material shall be one (1) sack CLSM per MAG Section 728.

For sanitary sewer lines and water lines that are to be constructed five (5) feet beyond an existing or proposed asphalt concrete pavement section, the backfill area shall be comprised of the area necessary to fill the trench zone from the top of the bedding layer through the top of subgrade. The backfill material shall be native material per MAG Section 601, Table 601-2.

For sanitary sewer lines and water lines that are to be constructed within five (5) feet of a proposed local and minor collector street (i.e. new development) the backfill area shall be comprised of the area necessary to fill the trench zone from the top of the bedding layer through the bottom of subgrade. The backfill material shall be native material per MAG Section 601, Table 601-2.

For sanitary sewer lines and water lines that are to be constructed within five (5) feet of a proposed industrial collector, major collector, or arterial street (i.e. new development) the backfill area shall be comprised of the area necessary to fill the trench zone from the top of the bedding layer through the top of subgrade. The backfill material shall be ABC per MAG Section 702, Table 702-1.

For City fiber optic and telecommunication lines that are to be constructed within five (5) feet of any roadway (existing, proposed, parallel or perpendicular to traffic) the backfill area shall be comprised of the area necessary to fill the trench/T-top zone from the top of the bedding layer through the top of subgrade. The backfill material shall be ABC per MAG Section 702, Table 702-1.

For City fiber optic and telecommunication lines that are to be constructed five (5) feet beyond any roadway (existing, proposed, parallel or perpendicular to traffic) the backfill area shall be comprised of the area necessary to fill the trench zone from the top of the bedding layer through the top of subgrade. The backfill material shall be native material per MAG Section 601, Table 601-2.

Mechanical compaction is the accepted method for compaction of backfill. Where applicable, the moisture content for mechanical compaction shall be that for which the specified compaction can be obtained. Mechanical compaction shall occur in lifts not to exceed one (1) foot.

Alternatively, water jetting is allowed for compaction of sanitary sewer lines and water lines to be constructed in proposed local and minor collector streets (i.e. new development). Specifications for water jetting can be found in the most recent version of MAG and the City of Avondale Supplement to MAG in Sections 601.4.5.

Backfill, around utilities that are exposed during trench excavation shall be placed in accordance with section 601.4.2.

601.4.5 COMPACTION METHODS: Delete the second paragraph entirely and replace it with the following.

Jetting shall be performed in four (4) foot lifts maximum. In between each lift a City of Avondale Engineering Inspector must inspect the lift to assure proper compaction. In addition, there must be at least a 24 hour waiting period prior to backfilling each subsequent lift.

SECTION 610 WATERLINE CONSTRUCTION

Subsection 610.2 GENERAL: Is modified to add:

610.2.1 City of Avondale General Requirements:

A. All construction water from City fire hydrants/lines/systems shall be metered, including waste, testing water, flushing water and water used for compaction, (contact City Engineering Inspector for more information). Systems shall be protected with proper, City approved backflow prevention systems per COA Standard Detail A1325 through A1327.

B. Mega-Lug type restraints are not acceptable for joint restraint when used on PVC pipe; thrust blocks sized per MAG Specification Section 610.14 are required.

C. Contractor shall provide adequate construction staking for all waterline installations including finish grade cut/fill dimensions, to allow for proper depth of installation and inspection. Minimum staking locations shall include all fittings, valves, fire hydrants, blow-offs, tie-ins, services, laterals, stubs, and change of horizontal/vertical direction. Refer to City of Avondale MAG Supplement Specifications and Details Section 105.8.2 for staking requirements.

Blue metal studs six (6) feet in length shall be used to mark the ends of laterals, stubs or services. The metal studs shall be buried to a depth of three (3) feet and shall extend three (3) feet above finish grade. In addition to the metal studs,

a 3M electronic marker ball shall be buried over the pipe end at a depth of three (3) feet to four (4) feet at the end of each service. Where applicable, concrete curb shall also be marked; with a stamped "W" in wet concrete or chisel etched in the existing concrete curb in accordance with MAG Standard detail 440-4 modified to "W" in lieu of an "S". Services shall be terminated in a meter box.

Subsection 610.3 MATERIALS: Is modified to add:

610.3.1 City of Avondale Material Requirements:

A. Water main material shall be according to the following schedule:

• 6 inch - 10 inch in subdivision: (Excluding fire Hydrant Laterals)	PVC, AWWA C-900, Pressure Class 200 Ductile Iron Pipe (DIP) Pressure Class 350, Cement Mortar Lined and Seal Coated ANSI/AWWA C151-A21.51
• 12 inch - 16 inch:	Ductile Iron Pipe (DIP) Pressure Class 350, Cement Mortar Lined and Seal Coated ANSI/AWWA C151-A21.51
• 24 inch - 36 inch:	Ductile Iron Pipe (DIP) Pressure Class 250 Cement Mortar Lined and Seal Coated ANSI/AWWA C151-A21.51
• 6 inch fire hydrant laterals:	Ductile Iron Pipe (DIP) Pressure Class 350, Cement Mortar Lined and Seal Coated ANSI/AWWA C151-A21.51

B. City approved technical material/manufacturer data is required to be submitted for all pipe materials and appurtenances used on the project before work commences. All materials must match the technical submittal data exactly or it will be rejected.

C. All materials shall be new and undamaged. Any PVC pipe material showing evidence of visible sun over exposure (ultraviolet damage indicated by discoloration) shall not be accepted. Any rejected materials shall be removed from the site immediately, or a cease work order will be issued.

Subsection 610.4 CONSTRUCTION METHODS: Is modified to delete the first paragraph and portions (A) and (B) of the paragraph and replace with the following:

All water mains shall be installed to a minimum depth of cover measured from the top of pipe to finished grade as listed below:

A. For waterline 16 inches in diameter and smaller, provide a minimum cover of 48 inches over the top of pipe.

B. For waterlines larger than 16 inches in diameter, provide a minimum cover of 60 inches over the top of pipe.

C. Public water mains that are installed through undeveloped property where the final finished grade elevation is not known, (i.e., future street alignments), a minimum cover of 60 inches over the top of the pipe shall be required.

D. New waterlines, fire lines, and water service lines shall not be installed in retention basins. Only landscape irrigation lines downstream of proposed backflow prevention devices may reside in the retention basins.

Subsection 610.4 CONSTRUCTION METHODS: Is modified to add:

610.4.1 City of Avondale Construction Requirements

Ten (10) gauge solid copper insulated tracer wire shall be installed on top of all water mains including fire lines and secured with industrial grade adhesive tape to prevent movement during backfill. Tracer wire shall be looped up into all valve boxes through a ½ inch PVC pipe sleeve per COA Standard detail A1215 and A1310. Sufficient length of slack shall be provided to allow the tracer wire to reach 12 inches above finished grade. All connections shall be kept to a minimum and shall be made with waterproof wire nuts. The entire system shall be interconnected and shall be tested for continuity. Tracer wire is not required on copper wire service lines.

Subsection 610.7 VALVES: Is modified to add:

610.7.1 Valves

All valves up to and including size 24 inch shall be resilient seat/wedge gate valves, epoxy-coated inside and outside in accordance with AWWA Specifications. All valves shall be located within the street.

610.7.2 Valve Boxes

All valve boxes installed on City water valves shall be two-piece adjustable cast iron per COA Standard Detain A1310. All lids shall be labeled for "WATER". Debris caps shall be required. Where indicated, bolt down type valve box lids shall be required.

All valve boxes (including those outside pavement areas) shall have a 48 inch diameter x six (6) inch thick cast-in-place concrete adjustment collar installed around the valve box and set 0.1 foot above finish grade. Water valve location signage using blue flexible Fiberglass flat post markers, shall be required for all locations outside of any paved areas including landscaped medians.

Subsection 610.10 CONNECTION TO EXISTING MAINS: Is modified to add:

610.10.1 Connection Requirements

Any and all valves on the existing City water system shall only be operated by the City Water Resources Department. Contact the City Water Resources Department a minimum of three (3) business days in advance of the desired connection date to coordinate connection. Any damage to existing facilities caused by any Contractors on the project shall become the responsibility of the City permit holder to resolve.

Pressure tests, disinfection and related testing shall be completed before opening valves to the existing system or connection onto existing system, and shall not be done without the City Engineering Inspectors approval. All waterline tests shall be performed prior to the connection into the existing water system.

Night tie-ins to existing utilities may be required to minimize service interruption to customers, and shall be scheduled with the City Water Resources Department a minimum of seven (7) business days in advance.

Same size connections using a tapping sleeve and valve shall not be permitted. In these cases, a "Tee" fitting shall be cut-in after the existing main line has been isolated and shut down. The City does not provide a tapping service. Waterline taps are the Contractor's responsibility.

Subsection 610.12 FIRE LINE SERVICE CONNECTIONS: Is modified to add:

Installation of fire backflow prevention assemblies shall be per City of Avondale Standard Detail A1325. Pressure testing of the backflow prevention assembly and related piping up to five (5) feet from the building shall be under the observation of the City Engineering Inspector.

Subsection 610.15 TESTING: Is modified to add:

The following tests and inspections shall be required on all waterlines:

A. All pipe material including fittings.

B. Trenching and pipe bedding.

C. Pipe installation including mains and service connections.

D. Thrust blocks/joint restraint systems.

E. Tracer wire installation including the tracer wire connectivity/continuity.

F. Shading of pipe; pipe zone backfill.

G. Tapping sleeve/valve installation and associated pressure test.

H. Backfill methods, depths and material.

I. Compaction densities with geotechnical testing provided by an independent Arizona certified firm.

J. Pavement replacement, if required.

K. Valve box inspection after adjustment.

L. Verification of open corp and curb stop valves for water services.

M. Physical verification that all valves are open.

N. Verification that fire hydrants are correctly installed and located per Standard Detail A1360 and are proper type per Standard Detail A1361.

O. Pressure testing of all new lines (per MAG Specifications).

P. Proper disinfection flushing, and related testing (contact City Water Resources Department for details and to schedule testing).

Q. Electrical current connectivity/continuity for cathodic protection systems on ductile iron pipe lines where cathodic protection is specified.

R. Special meter/valve manholes/vault structures.

S. Blow-offs and pressure relief valves.

T. Location markers for stubs, laterals and service location identification

Subsection 610.16 DISINFECTING WATERLINES: Is modified to add:

The Contractor shall flush and disinfect all waterlines per MAG Standard Specification Section 611; sampling shall be done by the City. Contact the City Water Resources Department Supervisor a minimum of three (3) business days in advance. All flushing water shall be metered.

SECTION
615
SEWER LINE CONSTRUCTION

Subsection 615.1 DESCRIPTION: Is modified to add:

615.1.1 Materials

Sewer pipe shall be according to the following schedule:

4 inch thru 12 inch	PVC SDR 35 (SDR 26 for depths greater than 12 feet)
15 inch thru 18 inch	PVC SDR 26, as required by the City,
21 inch thru 24 inch	High strength VCP
30 inch and larger	Lined RGRCP or project specific design
Force Mains or Special Use Sewer Lines	Ductile Iron Pipe (DIP) Pressure Class 250 Ceramic Epoxy lined as approved by City

City approved technical material/manufacturer data is required for all pipe materials and appurtenances used on the project before work commences. All materials must match the technical submittal data exactly or it will be rejected.

All materials shall be new and undamaged. Any PVC pipe material showing evidence of visible sun over exposure (ultraviolet damage indicated by discoloration) shall not be accepted. Any rejected materials shall be removed from the site immediately, or a cease work order will be issued.

615.1.2 Construction Methods:

No upstream sewer construction shall start until the down stream sewer main is completed and approved by the City. Pipe laying shall commence at the proposed project outfall on the existing City sewer and proceed upstream. Any exceptions to this specification shall be approved in writing by the City Engineer.

MAG Standard Detail 427 plug shall be installed in the furthest downstream manhole and remain in place until all sewer testing and cleaning is completed. Removal of the plug shall be done only under the supervision of the City Engineering Inspector. Under no circumstances shall the sewer plug be removed before City inspection. Should the sewer plug fail prior to City inspection, the Contractor shall, at his expense, hydro-vac the sewer to a location approved by the City Inspector to adequately remove all debris carried into the City mains. Video inspection after cleaning shall also be required, and shall be

paid for by the Contractor.) Any damage or cleaning expenses at affected lift stations and levied fines shall be paid for by the Contractor. The Contractor shall also be liable for any damage to private property and/or environmental damage/clean up.

Long term plugs (six (6) to 18 months) shall be required for upstream lines that are part of the next phase or another section not approved for use/acceptance at that time. Plug locations to be as directed by the City.

All mechanical plugs shall be tagged and documented for Contractor identification and location tracking per City Specifications. Tags and ID tracking numbers shall be provided by the City for proper installation by the Contractor. The Contractor shall be held financially liable for any blockage/back-up incident, associated fines or related damage caused by lost or forgotten plugs discovered in the City's sewer system.

Final tie-ins to the City's existing sewer system shall only be authorized by the City's Engineering Inspector or other assigned person after all related inspections and testing have been 100 percent completed to the satisfaction of the City.

615.4 LAYING PIPE: Is modified to add:

615.4.1 Sewer Line Construction Tolerances

The construction tolerance for the installation of sewer lines is such that under no circumstances shall the sewer flow velocity be less than two (2) feet per second (fps) with the sewer pipe flowing at d/D = 0.5.

Pipe shall be installed true to line and grade with allowable deviations of plus or minus 0.05 feet for pipe sizes larger than eight (8) inch yet including 12 inch, and plus or minus 0.10 feet for pipe sizes larger than 12 inches. This deviation is to be used for pipe inverts and dip deflections only.

Pipe eight (8) inches and smaller require all slopes to be greater or equal to 0.003.5 feet per foot. Flatter slopes will not be accepted.

The as-built invert elevations shall certify that the minimum velocity of two (2) fps has been maintained for each reach of the sewer line installation.

Subsection 615.7 SANITARY SEWER SERVICE TAPS: Is modified to add:

Minimum depth of cover for sewer services within City right-of-way and PUE's shall be five (5) feet or as shown on the plans. Exceptions will require City approval. All sewer service pipe shall be bedded and shaded with a City approved sand bedding material.

Green metal studs six (6) feet in length shall be used to mark the ends of laterals, stubs or services. Metal studs shall be buried to a depth of three (3) feet and shall extend three (3) feet above finish grade.

A sewer service shall be installed per MAG Standard Detail at all locations shown and noted on the plans. Residential service sizes shall be four (4) inches unless otherwise noted on the plans. Commercial service sizes shall be six (6) inches unless otherwise noted on the plans.

All sewer services must be installed past the right-of-way line to the easement line in public roadways; and in the case of private roadways where no easement exists, past the back of curbing and/or sidewalk.

City approved 3M type Electronic Ball Markers and cleanouts with electronic marker caps shall be required on all sewer services located in City ROW. Services shall be marked using MAG Standard Detail 440-1, or 440-3, as directed by the City.

In addition to the marker balls/clean-out caps, the concrete curb shall also be marked; stamped "S" in wet concrete or chisel etched with an "S" in the existing concrete in accordance with MAG Standard Detail 440-4.

Subsection 615.11 TESTING: Is modified to add:

Section 615.11.1 TESTS AND INSPECTIONS

The following tests and inspections shall be required on 100 percent of the lines:

A. All Pipe materials including fittings

B. Trenching and Pipe bedding

C. Installation of all main lines and service lines

D. Installation of cast-in-place manhole bases including subgrade compaction, water stops and reinforcing steel if necessary

E. Installation of precast manhole sections and adjusting rings

F. Manhole frame and covers

G. Shading of main lines and service lines; backfill of pipe zone

H. Connections to existing lines including existing stub outs, taps into existing manholes and installation of "wye" fittings

I. Backfill methods, depths and material

J. Compaction densities with Geotechnical Testing provided by an independent Arizona certified lab

K. Deflection measured by mandrel including force mains and special use sewer lines.

L. CCTV inspection to measure deflection, dips and to verify if line is true to line and grade

M. Low pressure air test in accordance with MAG Specification Section 615.11 (A)

N. Manhole lining systems if required

O. Pavement replacement, if required

P. Manhole frame and cover adjustments

Q. Manhole pesticide treatment; documentation as required

R. Final And cleaning of all mainlines; documentation as required

S. Location markers; stubs, laterals and service location identification

T. Lift stations if required

U. Force mains if required

CCTV inspection video to be on DVD format, indexed and professionally prepared. All main lines to be cleaned prior to video with water present. An industry standard depth measurement gauge shall be visible at all times and all video shall include stationing, manhole ID's and running length footages. Complete, detailed written reports with observations, problems, summaries and recommendations shall accompany all videos.

No testing shall take place until backfill and compaction activities for the sewer lines are 100 percent complete.

The low pressure air testing shall not take place until after the installation is complete on all dry utilities.

All testing shall be witnessed by the City's assigned Engineering Inspector or other City designated person. Independent, third party observers shall only be permitted if approved in writing by the City.

For construction inspection purposes, City furnished sewer invert worksheets shall be submitted, reviewed and approved by the City prior to the start of any street/concrete work. All as-built elevations of the manhole pipe inverts, as-built pipe lengths and recalculated pipe slopes shall be completed, checked, certified and submitted by a Registered Land Surveyor (RLS). Items out of tolerance shall be required to be reconstructed prior to starting the next construction phase. Failure to submit the worksheets in a timely, periodic manner shall cause the City to halt further construction and cease to issue subsequent permits. This sewer pipe invert as-built worksheet process is an inspection requirement and is separate from the City required submission of final as-built record drawings.

SECTION 625 MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS

Subsection 625.3 CONSTRUCTION METHODS: Is modified to add:

Subsection 625.3.3 Manhole Construction:

All manholes per MAG Detail 420. Manholes shall be five (5) foot diameter for sewer lines either 12 inch in diameter and larger, or ten (10) feet in depth or greater.

Manholes shall be per MAG Detail 420 Type B for sewer lines smaller than 12 inches with less than five (5) feet in depth.

Building/assembly of all pre-cast manholes shall utilize a flexible, self-sealing butyl sealant (Ram-Nek, ConSeal or other City approved equal) between all barrel sections including between the first barrel (bottom) section and the cast-in-place base.

No steps shall be allowed in manholes.

Manhole covers shall read "AVONDALE SANITARY SEWER" and shall be non-rocking, Deeter, NEENAH R-1595 or City approved equal.

Where manholes are located outside the street or sidewalk, there shall be a Class B cast-in-place concrete adjustment collar six (6) inches thick, and 12 inches wide placed around the manhole frame and flush with the top of the manhole frame. An identification sign green fiberglass flat rod shall be placed adjacent to the concrete ring.

All manholes to be treated with a roach pesticide paint type application. Pesticide shall be effective for a minimum of two (2) years.

All manhole bases shall be constructed using manhole adaptor gaskets (water stops) on the pipe inlets/outlets at the base connection. Gaskets shall be those approved on the submittals, all cast-in-place manhole bases shall be allowed to cure a minimum of 24 hours before barrel sections are set in place.

Core drilling new or existing manholes through the cast-in-place base section shall not be allowed. Pipes shall be set directly into the cast-in-place manhole base. The upper pipe penetration on a drop inlet or any pipe penetration through a manhole/precast structure shall only be done by core drilling the proper size outside diameter (OD) dimension to tightly secure/install the pipe by using a proper sized, City approved stainless steel mechanical seal (Link-Seal or other City approved equal). Destructive methods such as chiseling or jack hammering shall not be allowed. After the mechanical seal is positioned and set per the manufacturer's recommendations, the remaining void space on both sides of the seal shall be grouted flush with an approved non-shrink grout sealant material.

Final tie-ins on new manholes constructed on existing City sewer main lines shall not take place until final acceptance of the new sewer lines has been authorized by the City. Until the final tie-in is authorized, the existing sewer pipe shall not be cut into or penetrated in any manner.

SECTION
631
WATER TAPS AND METER SERVICE CONNECTION

Subsection 631.2 MATERIALS: Is modified to add:

All water services shall be installed per City of Avondale standards at all locations shown and noted on the plans. Residential service sizes shall be one (1) inch unless otherwise noted. All water services to be copper pipe type "K". Service saddles shall be heavy duty, two (2) piece brass/bronze material with four (4) bolt or heavy duty two (2) bolt connectors. Wide stainless steel bands are also acceptable. Only copper pipe and brass fittings to be used entirely unless otherwise directed. No joints are allowed underground between corps and curbstops. All corps and curbstops (meter/angle) to be "pac joint" type as approved by the City. Bedding and shading for copper service lines shall be City approved sand material per MAG Specification 701.3.

City does not provide tapping service. This is the responsibility of the Contractor.

End of Section

PART 700 MATERIALS

SECTION
710
ASPHALT CONCRETE

Subsection 710.1 GENERAL: Is modified to add:

710.1.1 Corrective Requirements for Deficiencies: Mineral aggregate gradation, asphalt cement content (oil), course thickness and compaction density test reports shall be submitted to the City for review and approval on both base and surface courses. Any paving that does not meet the MAG material and installation specifications, as amended by the City, shall be removed and replaced at the Contractor's expense. Fog seals, chip seals, slurry seals or other remedies shall not be accepted by the City. Extended warranties are also not accepted.

SECTION
750
IRON WATER PIPE AND FITTINGS

Subsection 750.3 JOINT REQUIREMENTS: This subsection Is modified to add the following paragraph to the end of this section.

Unless indicated on the plans or as otherwise directed, all ductile iron pipe lines shall be installed using a proper, City approved joint restraint system, Mega-Lug, Field Lock Gasket or City approved equal in lieu of concrete thrust blocks in accordance with MAG Standard Detail 303.

End of Section

PART 800 STREET LIGHTS

Add the following Section as an additional City of Avondale Supplement to the UNIFORM STANDARDS SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION as published by the MARICOPA ASSOCIATION OF GOVERNMENTS

SECTION
801
STREET LIGHTS

801.1 General Specifications

See Section 100 General Conditions for additional requirements.

801.2 Backfill

See Section 601 Trench Excavation, Backfill and Compaction for additional backfill requirements.

801.3 Permits

It is the sole responsibility of the Contractor to obtain all permits. Separate permits are required for conduit trenching and for the street light installations.

801.4 Submittals

Technical data on the following items shall be submitted to the City for review and approval prior to construction including, but not limited to the following:

- Poles, mast arms, fuse holders, conduit, conductors, photocells, concrete footings, "J" boxes, luminaires, lamps, etc.

801.5 Service

The Contractor shall furnish and install trench, conduit, conductor and backfill from the underground junction box to the pole and to the point of delivery as determined by the serving utility company. The Contractor shall coordinate with the serving utility company for routing of conduit and construction requirements.

801.6 Conduit

Conduit shall be installed at the depth specified on the plans and in accordance with the specifications of the serving utility company. Conduit between the pole and adjacent J-box shall be one (1) inch carflex liquid tight flexible nonmetallic

conduit or approved equal. Conduit must be UL rated and suitable for underground use.

801.7 Light Pole Identification

The Contractor shall furnish and install a number on each light pole; street light pole identification and numbering will be provided by the City of Avondale.

801.8 Restoration

It is the Contractors responsibility to restore all property, landscaping, sidewalk paving, and driveways that are disturbed during street light construction to their original condition.

801.9 Performance

Prior to acceptance, the Contractor/Owner/Developer shall energize and operate the entire roadway lighting system, for two (2) consecutive weeks without failure. If a lamp or ballast should fail, it shall be immediately replaced.

801.10 Pole Location

Unless otherwise specified, the preferred street light poles location shall be per City of Avondale Standard Details A1080 to A1083.

For local streets, street light pole may not be located closer than two (2) feet from back of curb to face of pole, or center of pole.

For arterial and collector streets, street light pole may not be located closer than three (3) feet from back of curb to face of pole or center of pole.

Shifting of pole locations to avoid minor conflicts (sidewalks, channels, other utilities, driveways, fences, etc.) in the field, shall be limited to a maximum of ten (10) feet parallel, or three (3) feet perpendicular to the street with City approval of the new location. The new street light locations shall maintain the minimum clearances from overhead and underground utilities, irrigation systems and back of street curbs. Shifting of the street light poles outside of the above limits will require submittal of recalculated photometrics. New street light locations will require proper "As-Built" documentation.

801.11 Direct Buried Poles

Backfill around direct buried poles shall be ABC material compacted in lifts using pneumatic or vibratory equipment. Compaction shall be to 95 percent minimum standard proctor. Density as defined by ASTM D-2922 and D-3017.

Embedded pole bottoms shall be uniformly half lap wrapped with Scotch 50 corrosion protection tape or approved equal, up to two (2) inches below hand hole.

801.12 Pole Types

Arterial roads, roads of regional significance, commercial collectors and other City designated roads shall use the architectural style steel pole, shoebox luminaire dark bronze in color, pedestal mount, with a luminaire mounting height of 40 feet.

Pole types and dimensions shall be approved in the submittal process. Contractors shall submit technical material specifications for City review and approval

All poles and mast arms shall be steel construction with a galvanized finish, gray color (except for the architectural style) material submittals required.

801.13 Certificate of Occupancy

No Certificate of Occupancy shall be approved by the City until all street lights are energized and as-builts received.

801.14 Sidewalks

Meandering sidewalks must be constructed in such a manner as to maintain a two (2) foot clearance of street light locations as designed. Street light pole location shall take precedence over sidewalk locations.

801.15 Luminaries

Luminaries including photocells shall be of a type approved by the City. Ballast shall be autotransformer, constant wattage, high PF with a multi-tap ballast. Material submittals required.

Unless otherwise directed on the plans, the photometric distribution for local, residential streets shall be Type II. All other streets shall be a Type III photometric distribution.

801.16 Driveway Clearance

Street light poles shall be a minimum of five (5) feet from the edge of a driveway wing.

801.17 Fire Hydrant Clearance

There shall be a minimum five (5) feet of clearance between fire hydrants and street light poles.

801.18 Other Clearance Items

Contractor to make sure pole and mast arms have proper clearance from overhead utility lines in accordance with the utility provider's specifications.

801.19 Right-of-Way

Street lights shall be installed in the right-of-way unless approved otherwise.

801.20 Variance

Lighting analysis shall be required for street dimensions and/or street light pole spacing that vary from the approved construction plans regarding roadway widths, spacing, and layout. This will be required for pole locations shifting more than ten (10) feet. See section 801.10 (Pole Location)

801.21 Foundation Elevation

All finished pole concrete pedestal foundations and adjacent electric junction pull boxes shall be set at sidewalk grade unless otherwise noted.

801.22 Survey Staking

It is the Developer's responsibility to provide a registered land surveyor to stake light poles and junction box locations.

End of Section

PART 900 TRAFFIC SIGNALS

Add the following Section as an additional City of Avondale Supplement to the UNIFORM STANDARDS SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION as published by the MARICOPA ASSOCIATION OF GOVERNMENTS

SECTION
901
TRAFFIC SIGNALS

901.1 General Specifications

A. See City of Avondale (COA), as listed in this sections and available on the City of Avondale Engineering Department website.

B. See Section 100 General Conditions for additional requirements.

901.2 Electrical Service

For electrical service requirements, contact the local utility provider for the specific area at least 60 working days before service is required. A City of Avondale building permit will be required.

901.3 Foundation Elevation

Top of all signal structure foundations shall be at the same elevation as the adjacent top of curb or not more than four (4) inches above the adjacent pavement with no existing curb.

901.4 Illuminated Street Name Signs (IISNS)

Contractor shall furnish mounting brackets and shall install internally illuminated street name signs (IISNS), both sides, in accordance with the City Standards, details and specifications (manufactured by Flouresco, Inc. or approved equal). The background for the IISNS shall be standard green, with the street name inscribed in white letters with Clearview font. The sign will include block numbers as shown on the plans. Cabinet shall match pole color. Three (3) foot x eight (8) foot flag mounted on ADOT style poles or four (4) foot x ten (10) foot flag mounted on trombone style poles. All legend block numbers and sign layout to be preapproved by City staff prior to manufacturing.

- Workmanship: All items shall be new; the material and workmanship shall be of the best quality for the purpose.

- Drawings: All signs shall be made in accordance with the details on the plans or drawings furnished by the COA Engineering Division. All sign layouts shall be the Contractor's responsibility and shall be subject to the COA's Engineering Division's approval.
- Warranty: Any sign delivered under contract which does not conform to these specifications shall be replaced by the Contractor at no cost to the Engineer.

A. Materials and Fabrication:

- Powder Coating: Aluminum frame and telescoping bracket shall be covered with opaque electrostatically applied TGIC POWDER COATING.
  - Thickness: The thickness of the TGIC Powder Coating fused to the aluminum frame and telescoping bracket shall be 0.002 inch minimum. Thickness shall be determined in accordance with ASTM Designation D-1400, or other methods of equivalent or greater accuracy. The referee method, in case of dispute, shall be photomicrography.
  - Color: Color shall be cocoa brown TGIC Powder Coating on the mounting bracket and frame unless otherwise specified.

B. Sign Sheeting

- 3M Diamond Grade Reflective Sheeting (prismatic lens sheeting) with green EC film applied over and graffiti film.
- Color shall be white letters on green background with City Logo.
- The application and screening procedures must be in accordance with the sheeting manufacturer's specifications. May be applied or screen printed.

C. Base Material:

- Description: The base metal substrate shall be new sheet aluminum alloy 3003-H14 or 5052-H32. The thickness of the aluminum shall be .050 inch. The material shall be subject to inspection prior to degreasing and chromate conversion coating operations. Alloy and temper designations shall be verified by mill test certifications.
- Shearing: All sign panel edges shall be shear-trimmed or roll-slit to produce neat edges and square corners. Sign panel shall be straight within 1/32 inch from the straight plane. Edge delamination or incomplete coverage of the base metal substrate up to and coincident with the cut edge of the sign panel shall be sufficient basis for rejection of the entire sign panel.
- Pretreatment: All treatment tanks and/or spray applied systems must be preformed on the Contractor's premises, to ensure proper adhesion of powder or reflective sheeting materials. All treatment tanks or spray applied systems shall be charged with fresh chemicals at least once a

year. If pretreatment is performed by immersion methods, the tanks must be sufficient size to accommodate the complete panel. Titration equipment shall be available for the inspectors to check the solutions' strengths. The cleaned and coated base metal shall be handled only by a mechanical device or by operators wearing clean cotton or rubber gloves. After cleaning and coating operations, the panels shall be protected at all times from contact or exposure to grease, oils, dust or other contaminates.

- The front and back surfaces of the aluminum base metal shall be cleaned, deoxidized, and coated with a light, tightly adherent chromate conversion coating free of any powdery residue. The base metal pretreatment process shall be in conformance with Section 5, "Recommended Processing Methods" of ASTM Designation B-449. The coating weight shall be (30-100 mg/sq. ft.) A class 1 coating.

D. Sign Message:

The following letters/border sizes shall be used:

- Street legend 12 inch Clearview font;
- Suffix and block number legend eight (8) inch uppercase Clearview font;

E. Finish:

- All finished signs shall have a smooth flat surface without defects or objectionable marks of any kind on either the front or the back faces. All letters and designs shall be clearly cut and sharply defined.
- The appearance of the sign face shall be uniform throughout and shall be free of wrinkles, gel, hard spots, streaks, extrusion marks, air bubbles or blemishes that may impair the serviceability, detract from the general appearance or color-matching of the sign when viewed from a distance of 25 feet.
- The finished sign shall be clean and free from all burrs, sharp edges, loose rivets and aluminum marks.
- Signs with any defects or damage that affect their appearance and serviceability will not be acceptable. All metal parts shall be fabricated in a uniform and quality workmanlike manner with all sign surfaces and edges free of defects. No repairs shall be made to the face sheet without the approval of the entities' Inspectors.

F. Packaging:

Packaging must be in accordance with the sheeting manufacturer's specifications. All signs shall be packaged in such a manner to insure delivery in perfect condition and shall be suitable protected for proper shipment and storage.

901.5 Traffic Control

Barricading, warning signs and traffic control shall comply with MAG Specification Sections 107.7, as amended by the City of Avondale MAG Supplement Specifications and Details and MAG Specification Section 401.2.

901.6 Grounding

Two (2) ground rods shall be installed adjacent to electrical service panel with bare bond conductor attached per COA Building Code requirements. A ground rod shall also be installed in center of controller cabinet foundation and in the main pull box.

901.7 Notification

City Engineering Department shall be notified three (3) business days in advance of every major phase of the construction work.

901.8 Controller and Controller Cabinet

2070 Type Controller with all signal system specification accessories required to run an eight (8) phase operation in Model 332 cabinet per City Standards. Cabinet, controllers and all associated hardware necessary for assembling and testing the controller to be delivered to the City for assembly, programming and testing. Once programmed and tested the Contractor shall pick-up and install the cabinet and notify the City three (3) business days prior to having the City install the controller.

901.9 Controller Orientation

Orientation of the controller cabinet and the main access door location to be approved by the City prior to installing the cabinet.

901.10 As-Built Drawings

The Contractor shall be responsible for preparing the final as-built drawings for the Traffic Signal Plans. The drawings shall be sealed by an Arizona Registered Civil Engineer, and/or Registered Land Surveyor (RLS).

901.11 Pavement Marking

Any pavement markings shown on the plans are for reference only. The signing and pavement markings shall be installed per the City approved signing and pavement markings plans.

901.12 Meter Cabinet

Meter cabinet shall include photoelectric cell (PEC) for street lights and IISNS per City Technical Specification available on the City website. Cabinet exterior to be anodized aluminum. An Uninterruptable Power Supply (UPS) system shall be part of the service pedestal.

901.13 Controller Cabinet Wiring

The controller cabinet shall be wired and labeled with the same phase number designation, as shown in the phase diagram. Each connector shall have all its pins brought to cabinet tie points. Controller cabinet wiring shall be per City color coding standards.

901.14 Emergency Vehicle Preemption

Emergency vehicle preemption shall be compatible with the design and brand used by the City per technical Specifications available on the City website. The controller cabinet shall be equipped with the required connector cable, software, and interface unit to accomplish emergency vehicle preemption operation.

901.15 Painting

Poles, exposed base plates, anchor nuts and bolts shall be painted "cocoa brown", per Valmont powder coated standard and specification. Minimum acceptance painting specifications shall comply with Valmont paint specifications.

901.16 Manufacturers

All signal poles and mast arms shall be manufactured by Valmont or other prior approved equal by the City, unless otherwise specified on the construction plans.

901.17 Submittals

Contractor shall comply with MAG Specification Section 105.2 (Plans and Shop Drawings) as amended by the City of Avondale MAG Supplemental Specifications and details for all materials and equipment. All submittals shall be City approved before construction.

901.18 Street Light Luminaire

Street light luminaire fixtures shall be installed per the City of Avondale General Engineering Requirements Manual, Chapter Three.

901.19 Signal Testing and Turn-on Procedure

A. The Contractor shall notify the City three (3) business days prior to actuation of the traffic signal. The Contractor shall conduct a test, with the City Inspector, to insure that the individual traffic and pedestrian signal heads and indications are operating for the appropriate phase and in the appropriate sequences.

B. The Contractor shall be responsible for the installation of 36 inch x 36 inch W18-9Z, Y/B, WITH FLAGS and FLASHERS per City Standards on all approaches to the new signalized intersection. The signs shall be installed a minimum of 500 feet in advance of the intersection at the back of sidewalk, or back of curb prior to signal activation on all approaches. Signs shall remain in place for a minimum of 30 days.

C. Signal shall be in flash mode for a minimum of 48 hours not including weekend days prior to full activation.

901.20 Certified Signal Technician

Any traffic signal construction, private or public, must be supervised by a certified IMSA Level II Signal Technician onsite throughout the duration of the construction.

901.21 Utility Trenching

The Contractor shall provide all trenching and pull boxes to the utility provider power source per the utility provider specifications. Any trenching, conduit and wire installation not provided by the utility provider, shall be the responsibility of the contractor.

901.22 Mounting Brackets

All type V and VII mounting brackets shall have terminal strips on the pole.

901.23 Conduit

All traffic signals conduits shall be Schedule 80 unless otherwise noted on the City approved construction plans. Traffic signal conduit configurations shall consist of two (2) four (4) inch conduits on all street crossing and a four (4) inch conduit for each signal pole. All conduit runs between pull boxes shall be straight with minimal deflections. Bends greater than 45 degrees shall have a pull box at angle points.

For Traffic Signal Interconnect conduit refer to COA Standard Detail A1070 and A1071.

901.24 Traffic Signal Poles

All arterial to arterial street intersections and street intersections on Avondale Boulevard shall be Trombone Style poles and mast arms. All other signalized street intersections shall be per Maricopa Department of Transportation (MCDOT) style unless otherwise directed by the City Engineer.

901.25 Traffic Signal Pull Boxes

All pull boxes shall be number seven (7) with embossed no-skid pattern Fibrolyte covers. All covers shall be labeled "Traffic Signal". Pull boxes for traffic signals shall be located within the street right-of-way.

901.26 Technical Data Submittals

Submittals to the City for Traffic Signals. Technical data on the following items shall be submitted to the City for review and approval prior to construction including, but not limited to the following:

- Traffic signal poles and mast arms
- Traffic signal heads complete
- Mounting brackets, etc.
- IISNS
- Controller cabinet complete, including controller load switches, conflict monitor, etc.
- All electrical cables, wiring, loop detectors if applicable, meter pedestal, etc.
- Conduit and pull boxes
- Traffic pole footings
- Emergency vehicle preemption hardware complete.
- Street light fixtures complete
- Pedestrian hardware, pushbuttons and heads
- Video detection
- Wireless communication equipment
- Power service pedestal with battery backup system
- Communication equipment (wireless and wired, as applicable)

901.27 Conflicts

Sidewalks and all other facilities in conflict shall be relocated or replaced as necessary to provide installation and access to signal poles.

901.28 Trombone Style Traffic Signal Concrete Footing

A. Design Data:

- Building Code: 2000 IBC (or most recently adopted design standard)
- Wind Loading Criteria = 90 MPH, Exposure C, 1=1.00
- Site Class = D
- Earthquake Spectral Response Acceleration:
  - at short periods S_s 50 percentage
  - at 1 second periods S_1 = 13.4 percentage
  - 1 = 1.00
- Concrete 28 day strength: FC = 4,000 psi
- Reinforcing Steel: ASTM A615 FY = 60,000 psi
- Plain Bolts and Anchors: ASTM A307

B. Foundation Work:

- Subsoils supporting or in direct contact with footings, or other foundation elements shall be protected against conditions that could cause movement or other detrimental effect to the structure as a whole or to any of its component parts.
- When working near existing and/or new construction, the Contractor shall exercise extreme caution so as not to undermine, disturb, damage or, in any way, cause undesirable movement, cracking, and/or settlement of the adjacent construction.
- All footings shall bear on undisturbed virgin soil or properly compacted backfill/granular fill as determined by a certified geotechnical engineer.

C. Concrete:

- Contractor shall not splice reinforcement steel unless approved by the engineer of record.
- Reinforcing in footings shall be accurately placed before placing concrete. Reinforcement shall not be "floated" into footings.
- Concrete shall be regular weight (144 PCF) with type 1 cement, potable water. Concrete shall conform to ACI 301-latest edition.
- Concrete shall be vibrated in conformance with ACI 309. Vibrate concrete only until the concrete is thoroughly consolidated and the voids filled. Insert internal vibrators vertically to the full depth of the layer being placed and into the previous layer if applicable. Do not drag vibrators through the concrete. Do not flow concrete from one location to another by use of vibrator.
- All reinforcing steel shall be deformed new billets bars (A615, Grade 60). Bent cold, and detailed, fabricated, and held in place in accordance with the "Manual of Standard Practice for Detailing Reinforcing Concrete Structures" (ACI 315 – Latest Edition) except as otherwise detailed or specified.
- Anchor bolts for column base plates shall be secured in place with the template and securely tied to reinforcing bars before placing of concrete.

Deviations from this practice will not be tolerated without the consent of the engineer.

D. Special Inspection:

Per IBC 2000: Section 1704, special inspection is required for the following items:

- Concrete:
  1) During the taking of test specimens (continuous).
  2) After excavation of footings and placement of reinforcement steel are complete (periodic).
  3) Verifying use of required mix design (periodic).
  4) During the maintenance of specified curing temperature and techniques (periodic).
- Bolts in Concrete:
  1) Prior to and during the placement of concrete (continuous).
- Duties and Responsibilities of the Special Inspector:
  1) The special inspector shall observe the various stages of construction to ensure the Contractor conforms with the approved design drawings and specifications.
  2) The special inspector shall keep records of inspections and furnish inspection reports to the building official and the engineer of record. Inspections shall be performed and reports submitted at a frequency agreed upon by the permit applicant and the building official prior to start of work.
  3) Inspection reports shall indicate the work inspected, and conformance to the approved construction documents. If discrepancies occur, the inspector shall notify the Contractor immediately for correction. If the discrepancies are not corrected, the inspector shall inform the building official and the engineer of record prior to Contractor completing that stage of construction.
  4) A final inspection report shall be submitted, documenting the required special inspections and noting any discrepancy that was corrected during construction.

End of Section

PART 1000 PAVEMENT MARKING AND SIGNING

Add the following Section as an additional City of Avondale Supplement to the UNIFORM STANDARDS SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION as published by the MARICOPA ASSOCIATION OF GOVERNMENTS

SECTION
1001
PAVEMENT MARKING AND SIGNING

1001.1 General Specifications

A. The work under this item will provide the final striping and marking of all pavements and the installation of traffic control signs as described herein in accordance with City of Avondale Standard Details and as shown on the plans.

B. Any striping other than the replacement of pre-existing striping shall be done in accordance with a plan prepared by a registered Engineer and approved by the COA Engineering Division.

C. All construction shall conform to the requirements set forth in the City of Avondale Supplement to MAG Specifications and Details. Items not covered under the City Supplement to MAG Specifications and Details shall conform to MCDOT Pavement Marking Manual, Arizona Department of Transportation (ADOT) Standard Drawings, Details and Specifications, or the "Manual on Uniform Traffic Control Devices" (MUTCD) latest edition, and ADOT Supplement MOAS, as applicable. Sign requirements, guidelines and warranties shall be in accordance with the MUTCD most current edition.

See Section 100 General Conditions for additional requirements.

1001.2 Pavement Markings

A. Permanent lane striping shall be hot-sprayed thermoplastic material conforming to all requirements of ADOT Standard Specifications Section 704, latest edition. Crosswalks and stop lines shall be 60 mil extruded hot thermoplastic material conforming to ADOT Standard Specifications Section 704.

B. The actual width of the stripe shall be:

Plan Width	Actual Width
4 inches	4 inches to 4.5 inches
6 inches	6 inches to 6.5 inches
8 inches	8 inches to 9 inches
over 8 inches	+/- 1 inch

C. Pavement symbols, arrows and legends shall be preformed markings, Type I (Permanent) conforming to all requirements of ADOT Standard Specifications Section 705, latest edition, unless noted otherwise on the plans.

D. Painting shall be provided on all median noses and at temporary pavement marking locations where indicated on the plans and standard details. Reflectorized paint materials shall be white or yellow as noted and shall meet ADOT Standard Specifications Section 708. Glass beads shall be applied to all painted surfaces.

E. Raised pavement markers shall conform to requirements of ADOT Standard Specification Section 706, latest edition.

F. Obliteration of any existing pavement marking required for new work shall be accomplished per COA Engineering Standards.

G. Permanent lane striping shall be hot-sprayed thermoplastic material conforming to all requirements of ADOT Standard Specifications Section 704, latest edition. Crosswalks and stop lines shall be 60 mil extruded hot thermoplastic material conforming to ADOT Standard Specifications Section 704.

1001.3 Signing

A. All traffic signs shown on the plans to be installed after the roadway improvements are completed shall be mounted on square tubular sign posts as specified herein when existing street light pole cannot be used, due to spacing or lack thereof. Traffic signs can be banded to street light poles if within 40 feet of proposed sign locations, or as otherwise approved by City Traffic Engineering Division.

B. Sign mounting heights and offset from edge of roadway shall be as directed by the COA Engineering Division in compliance with MUTCD and FHWA. Sign blanks shall be 0.080 gauge anodized aluminum sheeting, unless noted otherwise herein. Sign faces shall be totally reflective and with legends conforming to FHWA standards.

C. All existing signs which are not reused shall remain the property of the City and will be carefully removed and delivered to the COA Sign Shop. The Contractor shall remove any existing concrete bases using care not to damage the post.

1001.4 Steel Square Tubular Sign Post Assembly

A. The sign post assembly shall consist of the post (1¾ inch x 1¾ inch square tubing, length per sign type according to MUTCD), sleeve (2¼ inch x 2 ¼ inch x 12 inch long square tubing) and anchor (2 inch x inch x 36 inch long square tubing).

B. Material: Tubing shall be roll formed of 12 gauge steel or of a gauge sufficient to supply a minimum yield strength of 40,000 psi. Tubing shall conform to the Standard Specifications for Cold-Rolled Carbon Steel sheets, commercial quality, ASTM A-570, Grade 33 for plain finish, and ASTM A-446, Grade A galvanized finish.

C. Sign Post Finish:

Galvanized: All steel tubing shall be given a hot dipped zinc (galvanized) coating conforming to ASTM A-525, G-90. All exterior, interior and corner weld surfaces shall be thoroughly coated.

D. Shape: A cross section of the post shall be a square tube carefully rolled to size. Tubing shall be corner welded by high intensity resistance welding, in such a manner that neither the weld nor flash shall interfere with telescoping properties.

E. Holes or Knockouts: Hole or Knockout diameter shall be 7/16 inch plus or minus 1/64 inch on one (1) inch centers, on all four (4) sides of the post for its entire length. Holes or knockouts shall be on the centerline of each side in true alignment and placed opposite and adjacent to each other. Tolerance on hole or knockout spacing is plus or minus one-eighth (⅛) inch in four (4) feet. The sleeve and post tubing shall have the first two sets of knockouts pre-punched on one end.

F. Telescoping Properties: The finished post, sleeve and anchor shall be straight and have a smooth uniform finish. It shall be possible to telescope the post with each consecutive larger and smaller size of square tube, freely and for not less than ten (10) feet of their length without the necessary of matching any particular face to any other face. All ends shall be free from burrs and shall be cut square.

G. Anchor/Sleeve Installation: The Contractor shall install the anchor/sleeve by driving with a pneumatic hammer.

Pneumatic Hammer: The sign anchor and sleeve may be installed with a pneumatic hammer. The Contractor shall exercise extreme care to prevent deformation of the anchor tubing during installation. The sign post must be able to slide freely in and out of the anchor once it is in place.

1001.5 ADVANCE STREET NAME SIGNS

A. Material:

- Background shall be green, 3M Diamond Grade vinyl sheeting per FHWA standard specifications.
- Legend shall be silver, 3M Diamond Grade sheeting per FHWA standard specifications.
- The sign width shall be a standard 18 inches. The sign length shall be variable and sized according to legend. The minimum length shall be 42 inches and maximum length shall be 72 inches or other sizes determined by COA Engineering Division.
- All sheeting shall carry a ten (10) year guarantee not to lose more than 20 percent of initial reflectivity by the end of a ten (10) year period.

B. Sign Fabrication:

- All letters and numbers shall be "Series C". The first letter in each name shall be eight (8) inch upper case. All other letters shall be eight (8) inch lower case. In the event that a street name length will not fit on the maximum 72 inch blank, the letters shall be changed to "Series B". The street designation such as, Road, Street, etc., shall be abbreviated and may be down sized to a minimum of six (6) inches. These adjustments are to be made only when the street name is of such length that it will not fit on a 72 inch blank. All Series B and C lettering and numbers shall be in a Clearview font.
- All Streets name shall be properly centered on a sign blank

C. Sign Installation:

- Sign installations shall be made in a high quality manner. All signs shall be level within two (2) degrees. Sign poles shall be perpendicular to level plus or minus two (2) degrees. Signs shall be installed at a height of four (4) feet to the bottom of the sign.
- All signs shall be secured to each pole with no less than two (2) each, ⅜ inch steel drive rivets.
- All signs over 60 inches in length will require three (3) sign posts, equally spaced and centered on the sign.
- All signs must be clean and free of any contaminant upon completion of installation.

- The Engineer shall designate all sign locations.

1001.6 STREET NAME SIGNS

A. Materials:

- Sheeting shall be FHWA Diamond Grade per FHWA Standard Specifications. Background color shall be green, legend color shall be white.
- Sign blanks shall be nine (9) inch extruded aluminum blank, 0.091 gauge.
- Aluminum shall be chemically treated to meet ASTM B449 specification for corrosion resistance.

B. Arterial Street Sign Fabrication: (Arterial/Arterial; Arterial/Collector; Arterial/Residential Intersections)

The street name signs will be white 3M VIP Diamond Grade DG3 sheeting with green 3M Electronic Cutting (EC) Film applied over the sheeting. The sign material shall be applied to nine (9) inch wide extruded aluminum. The street name and the number of letters in the name will determine the length of the sign with a minimum of 24 inches.

- All letters and numbers shall be Clearview font
- The street name will be laid out with the first letter being six (6) inch high upper case and the other letters in the name being six (6) high lower case
- Letters and numbers for block numbering and street direction shall be three (3) inch high upper case with the same lettering font as the name
- All block numbering will be to the nearest hundredth
- The street designation (St, Av, Rd) shall be the same font as the rest of sign with the first letter being three (3) inch upper case and the remaining letters be three (3) inch lower case
- The designation shall be centered over the block numbers
- Refer to COA Standard Detail A1036

C. Residential Street Sign Fabrication: (Residential/Residential; Residential/Collector; Collector/Collector Intersections)

The street name signs will be white 3M VIP Diamond Grade DG3 sheeting with green 3M Electronic Cutting (EC) Film applied over the sheeting. The sign material shall be applied to nine (9) inch wide extruded aluminum. The street name and the number of letters in the name will determine the length of the sign with a minimum of 24 inches.

- All letters and numbers shall be upper case Clearview font
- The street name will be laid out with all letters in the name being four (4) inch upper case, centered on the sign.

- Letters and numbers for street block numbers, street designation (ST, AV, CTR, DR, LN) and street direction shall be two (2) inch upper case with the same font as the street name.
- The block numbers shall be centered on the sign with a horizontal arrow next to the numbering.
- All block numbering will be to the nearest hundred
- The street direction shall be in the top left corner with the designation in the top right corner
- If the street name is a number, then the street designation will also be a four (4) inch upper case letter size on the same line as the street number name
- Each number will be followed with letters (4^{th}, 3^{rd}, 1^{st}) as appropriate with the number and the lettering to be two (2) inch upper case and the top of the letter aligned with the top of the number.
- Refer to COA Standard Detail A1035

D. Other Traffic Signs (Stop, Regulatory, Warning Signs)

All signs shall conform to MUTCD, ADOT Supplement to MUTCD and ADOT Manual of Approved Signs requirements. Signs shall utilize 3M Diamond Grade DG3 reflective sheeting applied to 0.080 gauge anodized aluminum. All signs shall have 3M Series 1160A Graffiti Film applied.

E. Sign Brackets

Twelve (12) inch post attachment bracket for extruded sign (post size 1 ¾ inch x 1 ¾ inch post) heavy duty cantilever bracket for attaching sign to light pole (0.80 thickness and extruded)

Twelve (12) inch heavy duty cross bracket for extruded signs

1001.7 Raised Pavement Markers (RPMs)

RPMs shall be used on all arterial and collector roadways unless existing where no street lights are installed, and on all curved road sections of roadway. All RPMs per MUTCD, MCDOT Specifications and ADOT where necessary. RPMs shall be installed per approved plans in accordance with MUTCD manual, MCDOT Specifications and when applicable ADOT specifications.

1001.8 Pavement Marking and Signing General Notes

The following General Notes shall be included on the cover sheet of the Pavement Marking and Signing Improvement Plans:

A. The City of Avondale Engineering Department shall be notified three (3) business days prior to starting any signing or striping work.

B. Unless otherwise specified, all pavement marking and traffic control signing installations and removals shall conform to the requirements set forth in the City of Avondale Supplement to MAG Specifications and Details. Items not covered under the City Supplement to MAG Specifications and Details shall conform to MCDOT Pavement Marking Manual, Arizona Department of Transportation (ADOT) Standard Drawings, Details and Specifications, or the "Manual on Uniform Traffic Control Devices" (MUTCD) latest edition, and ADOT Supplement MOAS, as applicable. Sign requirements, guidelines and warranties shall be in accordance with the MUTCD most current edition.

C. The Contractor shall be responsible for the layout and installation of the permanent pavement markings following control points that have been set no more than 50 feet apart along the lines to be striped. Pavement marking dimensions are to center of the stripe for single line striping, and to center of the space between the two lines for double line striping. Where curb and gutter is present, dimensions are to the back of curb.

D. The pavement marking drawings are schematic only and not to scale. The Contractor shall follow all dimensions, notes, details and standards when installing pavement striping, markings and markers.

E. Temporary traffic control shall conform to the most recent editions of the City of Phoenix "Traffic Barricade Manual", the "Manual on Uniform Traffic Control Devices" (MUTCD) and/or as directed by the City of Avondale.

F. Unless otherwise directed, all final location lane striping including crosswalks and stop bars shall be thermoplastic material applied at a minimum thickness of 60 mil. All pavement symbols, arrows, and lettering shall be thermoplastic, Type II (permanent) preformed pavement markings. Temporary pavement markings shall be reflectorized traffic paint. Temporary striping of a half street roadway shall be paint.

G. All signs shall conform to the (MUTCD) and shall be made from .080 inch thick aluminum. Sign posts and extensions shall be galvanized square perforated steel tubing per City standards. Height requirements per MUTCD.

H. All traffic control sign faces shall be constructed of prismatic lens grade reflective sheeting such as 3M diamond grade reflective sheet, unless otherwise noted.

I. All signs shall have a minimum clearance from edge of sign to the face of the curb of at least two (2) feet; or if no curb exists, it shall be at least ten (10) feet from the edge of the pavement. All signs shall be placed so as to not interfere with pedestrian movement.

J. Any traffic control signage, including street name signs, which may be located within ten (10) feet of an existing street light pole, may be properly mounted to the pole with steel bands, with approval from the City. Sign locations and offsets may be adjusted by the City to improve visibility.

K. All concrete median curb noses shall be painted with yellow reflective safety paint from the front of the bullnose back ten (10) feet per MCDOT Pavement Marking Manual.

L. Raised Pavement Markers (RPM) shall be installed on arterial roadways without existing RPMs or roadways without full street lighting. All raised pavement markers shall be installed in accordance with ADOT Standard Drawings 4-M-2.02, 4-M-2.03.1, 4-M-2.03.2, and 4-M-2.04. Two-way Type M raised pavement markers shall be installed adjacent to fire hydrants per City of Avondale standards.

M. Any existing signage that is required to be relocated by the Contractor shall be removed, protected and stored for reinstallation by the Contractor. Damaged signage shall be replaced at the Contractor's expense. Any existing signs required to be permanently removed by the Contractor shall be salvaged for return to the City.

N. The Contractor shall remove all existing pavement markings and striping in conflict with the final striping plan, by ultra high pressure water (36,000 psi), or by slurry seal per MAG specification. All removal methods shall be done in conformance with E.P.A. requirements. If the removal of striping causes a depression of 1/8 inch or greater in the pavement surface, the Contractor shall fill and slurry seal the area per MAG Standard Specifications 713 and 715, Type II.

O. The Contractor shall clean the roadway surface to the satisfaction of the City by power broom, street sweeping, air jet blowing and/or water jet/truck prior to the placement of all pavement markings. The road pavement surface shall be absolutely dry. The air and pavement temperatures shall not be less than 55° F and 61° F for the placement of thermoplastic marking and Type I marking tape, respectively.

End of Section

PART 1100 GRADING AND DRAINAGE

Add the following Part as an additional City of Avondale Supplement to the UNIFORM STANDARDS SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION as published by the MARICOPA ASSOCIATION OF GOVERNMENTS

SECTION
1101
GRADING AND DRAINAGE

1101.1 General Specifications

See Section I00 General Conditions for additional requirements.

1101.2 Pad Certification

Developer's Engineer shall submit certification of constructed building pad elevations prior to request for final inspection.

1101.3 Drywell Percolation

Drywells must be drilled a minimum of five (5) feet into permeable porous strata. Inspection is required for the drywells before backfill and to verify installation of drainpipes and appurtenances before placement of rock. All drywells require field percolation tests stating the well shall drain at 0.1 cfs minimum. These test results shall be sealed by an engineer and submitted to the City.

1101.4 Grading and Drainage Plan Approval

Approval of Grading and Drainage plans provides for the construction of all surface improvements, including, but is not limited to retention areas and/or other drainage facilities, drainage ways, retaining walls, required drainage structures, subgrade for streets and building pad and finished floor elevations. The grading permit does not include the construction of storm drain or catch basins.

1101.5 Retention Basin Volume

Retention basins shall be constructed to the finished grades, side slope and provide the volumes per the approved construction plans. The allowable deviation from the approved finished grades of the retention basin are as follows:

Retention basin bottom = 0.4 feet plus or minus

Retention basin top = 0.2 feet plus or minus

Retention basin volume = The property owner shall provide the City with certified as-built dimensions of the retention basins and the actual volume of storage provided. This must be based on as-built topographic surveys performed by an Engineer or Land Surveyor licensed in the state of Arizona. These as-built-volumes must reflect permanent, finished landscaping in place. The as-built retention volume must meet or exceed the required design volume specified in the approved drainage report. A Letter of Certification prepared by an Engineer licensed in the state of Arizona must be submitted to the City, stating that the provided volume meets or exceeds the required retention volume, and that the drainage facility is constructed in accordance with the approved construction plans. The volume of storage provided must equal or exceed the approved design volume before the City will issue a Letter of Acceptance.

1101.6 Protection Devices

All drainage protective devices such as swales, interceptor ditches, pipes, protective berms, concrete channels or other measures designed to protect homes from storm runoff must be completed prior to any home construction.

1101.7 Street Curb and Gutter Temporary Ramps

No concrete removals shall take place at existing streets until paving operations begin. Contractor is responsible for "ramping" or protecting all existing concrete/asphalt. In addition, Contractor must provide for proper gutter drainage flow under any ramps by using steel or PVC pipe (schedule 80), size four-inch minimum diameter. Gutter ramps to be constructed of cold mix asphalt. Dirt is not allowed. Entry/exit ramps shall extend a minimum of 25 feet into the parcel and shall be constructed of crushed angular rock minimum of six (6) inches thick. Ramp length shall be determined by the site conditions. The ramp shall be wide enough to handle all construction traffic, 16 foot minimum width.

1101.8 Compaction

Grading Contractor responsible for soil compaction of perimeter fence wall foundations. A minimum 95 percent standard proctor density required.

1101.9 Certify of Occupancy

Clearance for occupation of any building shall not be approved until grading and drainage improvements are completed and approved.

1101.10 Drywells

All drywells to be registered with the Arizona Department of Environmental Quality. Contractor to contact ADEQ before drilling drywells.

Drywells shall be as follows:

- Residential, subdivision drainage retention basins shall be Torrent Resources, MaxWell IV Drywell, or approved equal.
- Commercial areas shall be Torrent Resources, MaxWell Plus Drywell, or City approved equal.
- Bulk petroleum sites, including, but not limited to gas stations, fuel islands, service stations, etc. shall be Torrent Resources, MaxWell Envibro System Drywell, or City approved equal.

1101.11 Submittals

- Material submittals including but not limited to drainage structures pipe manholes, bedding, backfill, concrete mix designs, steel, etc.
- Pad density test results.
- Trench density test results.
- Street fill areas in excess of two (2) feet density test required every one (1) foot of lift.
- Density tests for all wall footings.
- All soil lab test results for the site.
- As-built plans.
- Drywell drilling log, percolation test results.

1101.12 Arizona Pollutant Discharge Elimination System/Stormwater Pollution Prevention Plan

The Arizona Pollutant Discharge Elimination System (AZPDES) requirements under the E.P.A. General Permit for Arizona. All subcontractors shall comply with all AZPDES requirements under the supervision of the General Contractor, and shall submit a completed, signed subcontractor certification form, thereby designating themselves as co-permittees. The Contractor will be expected to develop the SWPPP and update/revise it as necessary throughout the construction of the project, in order to ensure compliance with the EPA permit requirements. Revisions to the SWPPP shall be subject to approval by the City of Avondale prior to implementation. The SWPPP shall be kept at the project site at all times, and the final SWPPP shall be retained by the Contractor for three years following project completion and final acceptance.

The Contractor shall submit a completed, signed N.O.I. form (including signed subcontractor certification forms) to Arizona Department of Environmental Quality (ADEQ) Water Permits Section/Stormwater NOI (5415B-3) 1110 W. Washington Street Phoenix, Arizona 85007 or fax to (602) 771-4674

Failure by the Contractor (or any applicable subcontractors) to submit the N.O.I. forms and certifications by the start of construction activities which leads to

delays in meeting E.P.A. requirements will result in delay of the start of construction. The N.O.I. shall be posted at the construction site along with the SWPPP. No construction activities shall begin until all applicable storm water pollution control devices are in place. Any additional work caused by the Contractor's (or subcontractor's) failure to properly implement the SWPPP shall be the Contractor's responsibility. The Contractor shall keep a copy of the latest STORM WATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITIES as printed in the Federal Register at the jobsite at all times. The Contractor shall keep a copy of the STORM WATER BASELINE CONSTRUCTION GENERAL PERMIT COVERAGE NOTICE received from the EPA (after submittal of the NOI) at the jobsite at all times.

All SWPPP reports required under this contract shall be available to the public in accordance with the requirements of Section 308 (b) of the Clean Water Act. The Contractor shall make plans available to the public upon request through the EPA.

No conditions of the Arizona General Permit or the SWPPP shall release the Contractor from any responsibilities or requirements under other environmental statutes or regulations. Asphalt plant and concrete plants (including mobile plants) require separate AZPDES industrial permits.

Upon completion and acceptance of the work performed by a subcontractor co-permittee, either the Contractor or other subcontractors shall absolve such subcontractor of any involvement in, or responsibility for, any subsequent AZPDES violations on the project. Upon total project completion, acceptance, and de-mobilization, the Contractor shall submit a completed, signed NOT form to Arizona Department of Environmental Quality (ADEQ) Water Permits Section/Stormwater NOI (5415B-3) 1110 W. Washington Street Phoenix, Arizona 85007 or fax to (602) 771-4674.

As a minimum, the Contractor shall inspect all storm water pollution control devices on the project on a monthly basis, and following each rainfall of 0.50 inches or more (as measured at the nearest Flood Control District of Maricopa County rain gauge, or approved onsite rain gauge). The Contractor is also encouraged to inspect devices following rainfalls of less than 0.50 inches, as it is the Contractor's responsibility to ensure the proper operation of each device.

The Contractor shall be responsible for all material, labor, and other incidentals related to furnishing, installing, and maintaining each item during project construction. Incidentals include, but are not limited to, periodic checks to ensure proper operation of pollution-control devices, maintenance, cleaning, repair, and disposal of device following storm events or other water runoff on the project. The Contractor shall maintain a record of each inspection.

1101.13 Storm Water Pollution Prevention Plans Construction Permit

Reference Avondale Municipal Code Chapter 8, Article III for Storm Water Quality Protection as it related to earth work and grading and drainage work in the City.

A. Any entity applying for a permit, authorization, license, or permission for construction activity that will disturb one (1) or more acres of land shall prepare a storm water pollution prevention plan (SWPPP) for the management of storm water discharges from the proposed construction site. The applicant shall refer to Volume III - Erosion Control of the Drainage Design Manual by the Flood Control District of Maricopa County, as amended, for guidance in developing the SWPPP. The SWPPP must indicate the addresses of all Maricopa County parcel numbers of all affected properties. Please see City Code Chapter 8-48 for the City's minimum, specific SWPPP requirements, in addition to what is required by the construction general permit.

B. Both structural and non-structural best management practices shall be implemented and maintained at the construction site. Any post-construction storm water management measure to be installed or completed during the construction period shall be designed and installed consistent with the city's general engineering requirements, and meet all applicable authorization and management requirements under state and federal law.

C. The applicant shall provide an accurate and complete SWPPP to the City's NPDES coordinator for review before a construction permit is issued by the city. In cases where an application is submitted for a grading permit, such permit shall not be issued until the City's NPDES coordinator has reviewed and approved the best management practices and the permit shall be made conditional upon compliance with the best management practices. If the City's NPDES coordinator determines that the SWPPP is inadequate, the City's NPDES coordinator may authorize and require additional best management practices or and/or configurations thereof.

D. The City's NPDES coordinator shall have the right to enter and inspect private/communal drainage facilities in accordance with the provisions of section 8-52 of this article. (Ord. No. 1188-606, § 5, 6-5-06)

E. Along with the SWPPP, the applicant shall submit to the City's NPDES coordinator the following:

- A copy of an accurate and complete (including signature) NOI issued to the permitting authority to seek coverage under the construction general permit.
- A copy of the Maricopa County Rule 310 (air permit) application approval for the project.

- A copy of Notice of Termination (NOT) sent to ADEQ once the construction is completed as defined in the General Permit.

1101.14 Best Management Practices Documentation

All land-disturbing activities at the construction site shall be completed in accordance with the SWPPP. The permittee shall implement all best management practices as described in the SWPPP and periodically inspect them to ensure that they are operating correctly and have not been damaged and/or altered. The permittee shall conduct periodic inspections and maintain an inspection log or report in accordance with the construction general permit by the permitting authority. (Ord. No. 1188-606, § 3, 6-5-06)

End of Section

PART 1200 STORM DRAIN

Add the following Part as an additional City of Avondale Supplement to the UNIFORM STANDARDS SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION as published by the MARICOPA ASSOCIATION OF GOVERNMENTS.

SECTION
1201
STORM DRAIN

1201.1 General Specifications

See Section I00 General Conditions for additional requirements.

1201.2 Material

Storm drain materials shall be per MAG specifications as approved by the City.

1201.3 Rubber Gasket Reinforced Concrete Pipe (RGRCP)

Minimum class for RGRCP under streets shall be Class IV pipe.

1201.4 Manholes

All storm drain manhole lids shall read "Avondale Storm Sewer" and shall be non-rocking Neenah brand or city approved equal.

1201.5 Submittals

Technical data on the following items shall be submitted to the City for review and approval prior to construction. Included, but not limited to:

- Pipe materials including all fittings, gaskets, and seal
- Manhole materials including concrete mix designs, precast items, frame and cover gaskets, flexible gaskets, and steps.
- Bedding and other backfill materials
- Trench density tests
- Tabular as-built surveys for lateral and stub inverts.
- TV video inspection, if required.
- Jet-vac cleaning records.
- As-built recording drawing plans.
- Reinforcing steel

1201.6 Pavement Replacement

Pavement replacement, See Section 100 General Conditions.

1201.7 Start of Construction

No upstream storm drain construction shall start until the down stream storm drain system is completed and approved by the City. Pipe laying shall commence at the proposed outfall to the existing storm drain.

1201.8 AS-BUILT DRAWINGS

The Contractor shall submit a RLS certified as-built spreadsheet listing manhole number, corresponding MH invert elevations, pipe slopes, lateral, stub out fall elevations, top of cone shaft/flat top elevation, and rim elevations. All elevations shall be taken prior to backfill.

1201.9 BACKFILL

- All storm drain and laterals shall be in accordance with MAG Part 600 or as modified here in.
- Longitudinal trench backfill in new arterial roadways or adjacent to existing roadways or within the ultimate right-of-way and future roadways shall require full depth approved ABC material or 100 percent one (1) sack CLSM as directed by the City. ABC backfill compaction shall be by an approved mechanical method with backfill material lifts: 12 inch lifts (loose) to be used in the top four (4) feet of trench, 24 inch lifts (loose) to be used over four (4) feet of trench depth per MAG Specification Section 601.4.
- Transverse trench backfill in existing roadways or new arterials shall require full depth approved ABC or 100 percent one (1) sack CLSM as directed by the City.
- Compaction by water jetting or trench flooding per MAG Specification 601.4 is only allowed for water trench backfill and compaction in new local and collector street roadways within new developments. Backfill material lifts for water jetting or trench flooding shall not exceed four (4) feet (loose) in depth, water consolidation shall not be allowed for backfill and compaction of waterline trenches or adjacent to existing roadways and new existing street roadways.

1201.10 Safety Rail

Install safety rails per MAG Standard Detail 145 at all headwall and scupper locations.

1201.11 Access Barriers

Headwalls with pipes greater or equal to 18 inches in diameter shall have access barriers. Provide separate detail drawing. Access barriers shall be flush mounted to the headwall and be child resistant.

End of Section